The AMERICAN HOROLOGIST

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THE AMERICAN HOROLOGIST

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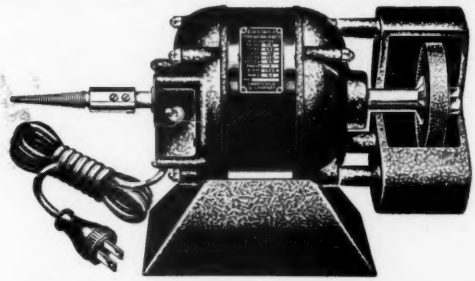

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Employs a ¼ H. P. Motor

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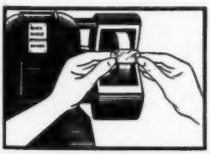

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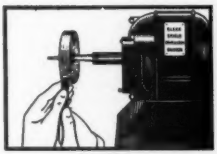

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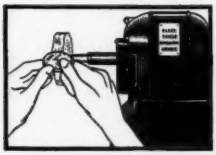

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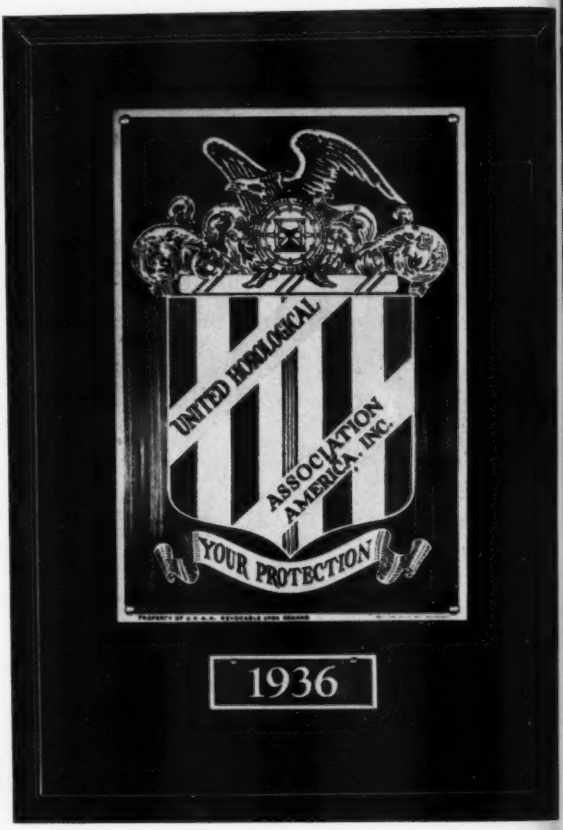
PERMANENT PLAQUES NOW AVALIABLE

The permanent plaques are now available to our membership and must be applied for in the regular way by first securing an application from your nearest Guild, State Secretary, Special Representative or to National Headquarters.

Under no consideration will the national plaque be leased to members who have not filed an application blank or the regular lease form of contract.



EXPLANATION OF PLAQUE

The permanent plaques are of a most unusual design. Truly a thing of beauty, which will not only attract attention, but add dignity to any window or store displaying same. Our permanent plaques are bronze inlaid with red, white and blue enamel mounted on a black satin finished wood base, year date is also in bronze. There are two sizes, the smallest being 8x5¼ inches and the largest 9¾x6¾ inches.

The plaques are not sold. They are leased by the calendar year. The first year rental on the large plaque is $1.50. The rental on the small plaque is $1.00 per year. The following year's rental on both plaques are the same, $1.00 per year.

Each year we supply plaque holders with a bronze year date, which is easily attached to the plague.

Should certification be secured by our members holding the plaque, the year date plate is inserted at the top and the certification plate below the regular design, thus combining the plaque and member's qualifications.

Mention "The American Horologist"

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Special Tools and Tool Improvements Our Specialty

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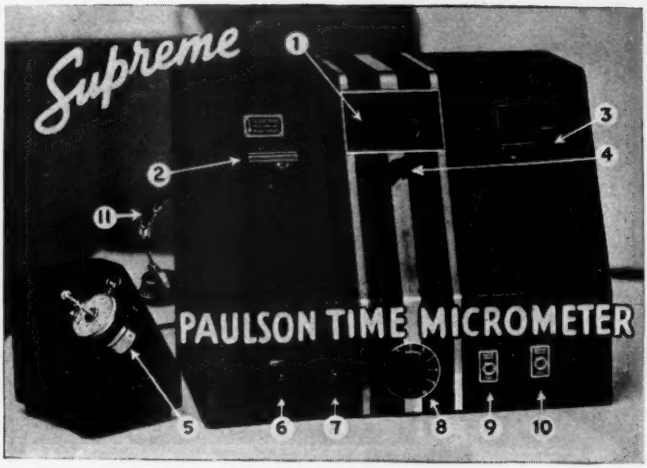
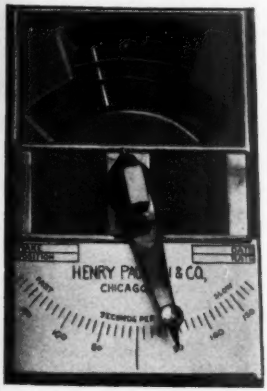


FINDS BUSINESS FOR YOU!

The MODEL D Paulson Time Micrometer

Automatically corrects the fluctuations in alternating current. This new invention simplifies and speeds up the rating of watches so that it is now possible in a few seconds to get a 24 hour rating.



Patent Applied For

The new recording device on Model "E" Paulson Time Micrometer.

VISUAL READING ON ALL MODELS

QUICKLY PAYS for ITSELF

Hundreds of jewelers are daily profiting from the great advantages of the Paulson Time Micrometer, not only as a labor saver but as a tremendous force in building business.

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Guaranteed to give entire satisfaction. It cannot be otherwise. Built on scientific principles by engineers who have devoted years to its development.

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USE THIS HANDY COUPON for further information.

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U. H. A.—2-27

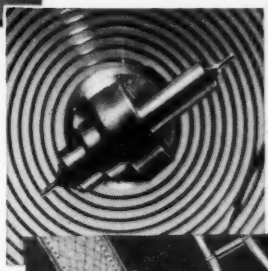
THE NEWS IN PICTURES

3 MEN AND A WATCH tell a story of family tradition in Elgin craftsmanship. Austin Benedict (center), now pensioned, exhibits to son Roy (finishing dept.) and grandson Roy Jr. (escape dept.) an Elgin he helped create in 1891. Together the three Benedicts have spent a total of 70 years with Elgin.

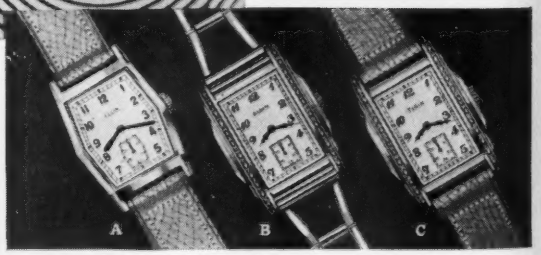
PEEK-A-BOO! (left) Astronomer Neidigh gets in touch with the heavens at Elgin's famed observatory.

PLEASANT PEASANT (right)—Charming Loro Roberts writes: "I chose our twelfth family Elgin." She is featured in Elgin advertising during March.

FAST WORK (right)—432,000 motions per day is the schedule of a balance staff. The taper at the base of the pivots on this Elgin staff adds strength where it is most needed.



ORCHIDS to Mr. Clarence Olsen, Chicago jeweler. Mr. Olsen had the best Christmas in years in 1936—"thanks largely to Elgin's dealer support," he says.



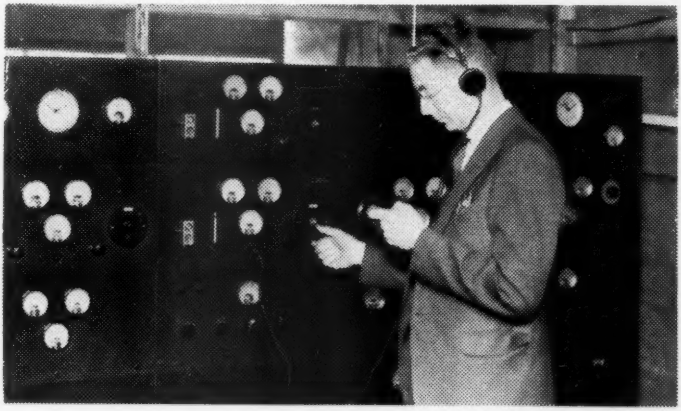
"CAVALIERS"—Welcome! These watches are the newest of the group which offers the technical advances of the 8/0 movement at prices from $20 to $29.75. **A**—*1808 . . . 8/0, 7 j., Veritas metal. Emb. dial. Cons. price $20. List $22.40.* **B**—*1824 . . . 8/0, 7 j., Veritas metal, metal band. Emb. dial. Cons. price $23.75. List $23.70.* **C**—*1814 . . . 8/0, 7 j., Veritas metal. Emb. dial. Cons. price $22.50. List $22.50.*

'Clock' Attuned to Stars Splits Seconds Into Fractions

By the Natural Science Correspondent of the Christian Science Monitor.

WHEN you hear the gong is will be exactly 77,999 hundred thousandths of a second after 23:31 o'clock 73rd Meridian time.

The reader may never hear this announcement over the radio, but engineers at the General Electric research laboratories have perfected a timepiece which keeps so closely in step with the stars that a single second can be split into 100,000 parts. It is an electron-tube device which at first glance seems a complicated maze of dials and knobs. Close examination, however, discloses two clocks with conventional faces, all the other gadgets being for specialists who split hairs over split seconds.



Courtesy General Electric and The Christian Science Monitor.

GENERAL ELECTRIC CLOCK
New Electron-Tube Device Allows Hair-Splitting Natural Scientists to Split Seconds Into 100,000 Parts. This Clock Is Said to Be Never More Than One Tenth of a Second Slow or Fast.

So small is the error in this "clock" that approximately a year and a half would be required for it to slow down or speed up by so much as one minute. Corrections are applied daily, however, so it is never off more than a tenth of a second.

The "pendulum" is a thin slice of natural quartz crystal which expands and contracts when an electric potential is applied. So formidable is the rest of the device that its bulk removes it forever from pocket-watch categories. Its most valued use at present lies in the field of radio, where it serves as a frequency standard for calibrating various instruments employed in the manufacturing and research activities of General Electric, and for measuring the frequency of its broadcasting stations. The device is used primarily by Dr. W. A. Ford of the laboratory staff.

The error of the crystal-controlled oscillator as compared with star time is at the average rate of one-tenth of a second a day. However, with corrections applied, even this minute inaccuracy is not allowed to accumulate and reach an appreciable magnitude. The clocks are checked every day at noon with the Arlington Naval Observatory time signals sent out by radio.

Extreme precision in grinding the crystal is necessary to obtain oscillations of such accuracy. Although the crystal

is cut so as to have an extremely low-frequency change with temperature, additional stabilization is obtained by mounting it in a small box in which the temperature is themostatically controlled to within a hundredth of a degree.

Attention, National Affiliates

You are hereby requested to forward to national headquarters, the correct name and address of your national trustee and delegates.

Executive Board Members' Annual Meeting, Sunday, April 25, 1937, in the Executive Secretary's offices, Congress Hotel, Chicago, Ill., at 1:30 p. m. Second Executive Board Meeting, Wednesday, April 28, 1937, in Secretary's Offices, time to be announced later. All executives should arrange to be present.

In electing your delegates to National Convention, please elect an alternate for each regularly elected delegate. Official credential blanks will be supplied upon demand in quantity needed.

Your national trustee shall act as chairman of your delegates, in accordance to National By Laws, Article V. F.

Number of delegates eligible in accordance to By Laws, Article IV, Section 5, one delegate for every unit of 50 members or fractional part thereof. For further detailed information, refer to National By Laws or National Headquarters.

In all cases, the By Laws refer to paid up members.

Resolutions and Amendments

Resolutions and amendments to be presented, must be forwarded to National Office, 30 days previous to April 26, 1937. For more complete information on conventions and presentation of resolutions, refer to Article IX, Sections 7, 8, 9, 10, 11, 12, 13.

Article X should be carefully observed at this time.

Election of Officers

April 28, 1937, Chicago, Ill.

Officers elected for one year term, April 29, 1936:

President, Frank Foegler, Cincinnati, Ohio; Vice-President, Thomas J. Fagan, Boston, Mass.; Treasurer, Elmer Schneider, Toledo, Ohio.

Executive Board Members elected for two years, April 28, 1935:

A. R. Raphael, New Haven, Conn.; L. W. Heimberger, Columbus, Ohio.

These offices will be subject to nominations:

President, one year; Vice-President, one year; Treasurer, one year. Two executives, three years each.

ORVILLE R. HAGANS,
Executive Secretary.

Since the discovery of America, 25,000 tons, or 17 billion dollars worth of gold, has been produced in the world. This amount would make a solid gold tower 20 feet in diameter and 140 feet high.

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Absolutely the Highest Grade Lubricant Ever Produced for Watches—Clocks—Chronometers

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HOOVER & STRONG, INC.

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ESTABLISHED IN 1912

WRITE US FOR THE SOLDERS YOU NEED

The Electric Clock

By D. L. Thompson

The electric clock has all but replaced the weight and spring driven ones and a little of the history, theory and construction of them might be interesting.

The application of electricity to the operation of clocks dates back to 1840 when Alexander Bain, an Englishman, obtained a patent for an electrically controlled clock system. In this system he used a regular weight driven and pendulum escapement movement as the master clock. The pendulum had a small metal finger attached to it and as it swung back and forth this finger made contact with a stationary contact, once per second, which closed an electrical circuit that caused an impulse to be imparted to a number of secondary clock mechanisms which were connected in series with a direct current battery. In each of the secondary clocks there was a coil magnet. With each impulse transmitted by the master clock the magnet would attract an armature to which was attached a pawl. The pawl contacted a ratchet attached to a train of gears which with each impulse would advance the hands and thus keep the secondary clocks in time with the master clock.

Another electrically controlled clock system, also conceived by Bain, was the utilization of a permanent magnet attached to the lower end of the pendulum and a coil magnet so placed that the pendulum in swinging would pass over it. The pendulum in this system had a finger attached to it and once per second made a contact that closed the circuit through the coil magnet and a direct current battery. This current would energize the coil magnet for a moment with each swing of the pendulum, the coil magnet attracting the permanent magnet, attached to the pendulum, thus giving it a little pull periodically and keeping it in constant motion and amplitude of swing. A regular clock train was used but by a change in the construction of the escapement the pendulum was made to drive the clock works instead of the clock works driving the pendulum. This type of clock is still in use, a small battery providing sufficient current to operate it over a period of many months. Used as a master clock, any number of secondary clocks, of the same construction, may be used in a system, the master clock controlling the impulse to all.

There have been many variations of both of the above systems but the principle remains the same. A well known clock system in use for many years in this country uses the first of the two systems above described.

Both of the above systems were, and are, satisfactory for buildings in which a great number of clocks are controlled from one master clock and have the advantage that they are practically free from the interruptions caused by current failure such as afflicts our modern synchronous electric clocks which are operated from our electric supply mains. The synchronous electric alarm clock has yet to eliminate the spring-driven ones, in cities, for the reason that there is still the uncertainty of an uninterrupted current supply.

The modern synchronous electric clock, which is operated from the regular alternating current supply mains in every community, was the invention of Henry E. Warren, an Electrical Engineer, who, in 1916, visualized the timekeeping possibilities of the synchronous alternating current motor. This type of motor had been in use for many years, but was used only on small load jobs such as electric fans as it is unsatisfactory on heavy loads. It is made in both the self-starting and manual starting types. We shall discuss only the manual starting type at this time, but later we have been promised an article from the

Warren Telechron Company, of Ashland, Mass., giving a full description of their self-starting Telechron motor and its applicatioin to their clocks and clock systems.

The manually started electric clock consists of a small synchronous electric motor, that runs at constant and unvarying speed so long as a constant unchanging frequency current is supplied to it, and a set of reducing gears to turn the minute hand once per hour, the motion work for the hour hand being similar to that used in the regular clock. The time-keeping of this type of electric clock depends absolutely upon a steady frequency in the current supply and uninterrupted service as to this supply. Electric Power Stations in America, excepting possibly a few, maintain a current frequency of 60 cycles. This is an alternating current reversing in direction through the wires 120 times per second. Current can be produced at practically any frequency desired but this frequency has been chosen for the reason that it gives the most satisfactory results in the operation of incandescent lamps which is by far the greatest current load on most central stations.

The synchronous motor as used in many electric clocks of the manually starting type is the simplest of all motors to construct as it consists of relatively few parts; two field poles, a field coil and a rotor disc. Fig. 1 is a diagram of the design of such a motor. FP and FP are the two field poles. FC is the field coil, and R is the rotor. FP and FP are built up of thin sheets of a specially prepared magnet iron insulated from each other by a thin coating of an insulating compound, similar to varnish, and tightly bolted together. They are so constructed to limit the flow of local, or eddy currents within themselves which in solid poles causes excessive heating. FC is the field coil which consists of many turns of fine wire of such a length and resistance to the current as to give the required magnetizing effect to the poles and to carry the current without excessive heating. This coil is placed on a bar of iron and this is bolted to the lower ends of the field pole pieces. This bar is usually of laminated construction similar to the pole pieces. R is the rotor which is usually a disc and of laminated construction.

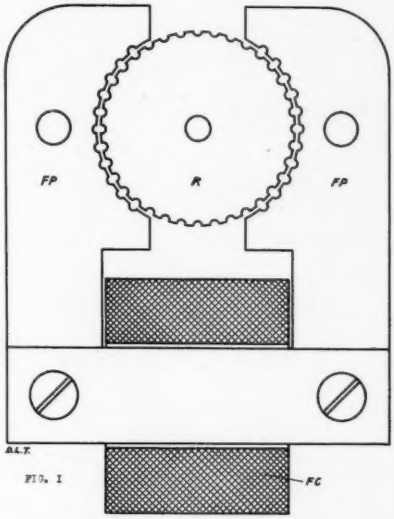

FIG. 1

The motor as above described having two poles and a disc rotor, with no teeth, would, if operated on a 60 cycle current, run at a speed of 3,600 revolutions per minute. This is an excessive and unnecessary speed which might tend to cause excessive wear on all moving parts. Some clock motors are built to run at this speed but most are designed to run at about 200 revolutions per minute which is quite fast enough for practical purposes. To reduce the speed of the rotor to 200 R. P. M. the rotor and field pole pieces are notched which has the effect of increasing the number of poles of the motor.

The formula for calculating the speed of synchronous motors where there is no slip of the rotor caused by a heavy load is:

$$\text{Revolutions per minute} = \frac{120 \times \text{frequency}}{\text{number of poles}}$$

For a motor of only two poles and a

round disc rotor the formula works out thus:

$$\text{R. P. M.} = \frac{120 \times 60}{2} = 3600.$$

For the motor of 200 revolutions per minute, to find the number of poles required, we alter the formula to:

$$\text{Number of poles} = \frac{120 \times \text{frequency}}{\text{Revs. per minute}}$$

and so:

$$\text{Number of poles} = \frac{120 \times 60}{200} = 36.$$

Thus we have 36 as the required number of poles and this is secured by notching the edge of the rotor so that there will be 36 pole faces extending above the general circle of the rotor disc. The field pole faces are similarly notched but the number of faces on the field poles does not affect the speed of rotation of the rotor but only gives a greater pulling effect on it.

The pulling effect of the field pole pieces on the rotor is caused by a shifting magnetic field. All are acquainted with the effect of two bar magnets upon each other. If the magnets are placed with similar poles, as north and north, adjacent they will repel each other, while if they are placed so that opposite poles are adjacent they will attract each other. In the synchronous motor, which operates only on an alternating current, the two field pole pieces are alternately north and south 60 times per second, for 60 cycle current, as the current through the field coil reverses in direction 120 times per second. The rotor is constructed of a special iron which retains its magnetism, somewhat, and is, in effect, a magnet suspended on bearings between the field pole faces and free to rotate. As the magnetism of the field pole pieces shifts between them the rotor has a tendency to align its pole faces magnetically with the field poles. Two bar magnets and a compass will serve to show this action clearly. Fig. 2 shows two bar magnets placed in a position similar to the two field pole pieces of a motor and having a compass placed between them. The compass needle quickly aligns itself magnetically as shown in the two views when the poles of the magnets are shifted. What is done manually here in shifting the two magnets is done electrically in the motor by the alternating character of the current. However, there is no turning force possible on the rotor due to the extremely fast shifting of the field

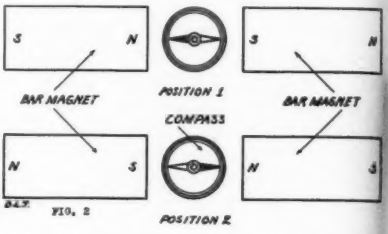

FIG. 2

pole magnetism unless the rotor is started manually at a speed equal to the operating speed at which time the rotor will follow at the speed of the shifting poles, the enertia of the mass of the rotor keeping it in motion at the time of the reversals of the current from one polarity to the other at which time the current, and therewith the magnetism of the field poles, dies down to zero. Immediately the current will rise again to its greatest value and this builds up the magnetism of the field pole pieces concurrently which exerts a magnetic force on the rotor again, and so on. This gives a continuous turning movement to the rotor at a speed in absolute synchronism with the frequency of the current supply. In the motor under discussion which has 36 rotor poles and operates on a 60 cycle current there will be 200 revolutions of the rotor per minute. This is so for the reason that with 60 cycle current supply there will be 60 attractions of the rotor per second. Each of these attractions will align two of the teeth of the rotor with the field pole pieces. 60 x 2=120, which divided by 36 (which is the number of teeth on the rotor completing one revolution) gives 3.3333+turns per second and this will be 200 turns per minute.

The gear reduction to operate the

(Continued on Page 22)

Genuine HAMILTON CROWNS

NEW ASSORTMENT CASE CONTAINS 4 DOZEN DIFFERENT STYLES AND SIZES

$15

SAVE yourself time and money. Give your trade better service. Rest assured that the job was right when it left your store.

This new Crown Assortment Case contains a bottle for every Hamilton Watch made, from the 12 size and smaller, including all of the new models. The bottles contain crowns in white or natural yellow gold-filled, or both, depending upon the finish in which the original cases are made, 48 different Genuine Hamilton Crowns are included in the assortment.

In addition, extra bottles are provided for new crowns which may come out for future models.

Cases, 11¾ x 6 x 1¼ inches, are Fabrikoid, with a velveteen lining. A handy reference chart in the top tells you at a glance just which crown to use for every Hamilton case.

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HAMILTON WATCH CO., LANCASTER, PA.

WATCHMAKERS!

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1,872,812—1,817,266—1,907,366

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2. Our patented Monel-Metal mesh basket, found on every L & R Machine, is your assurance of a flawless job. Although this basket will accommodate the parts of more than one watch, the fact that parts may become mixed prompts us to suggest cleaning one at a time. This basket is so constructed as to protect the most delicate parts and assure you against the loss of the smallest.

3. Each machine is equipped with three jars, one for the cleaning solution and the others for successive rinsings. Thru continuous experiment, we have found them the correct size, neither too large nor too small. Only three jars are needed, additional jars are superfluous.

4. The NON-INFLAMMABLE solutions made by the L & R are for the best cleaning job. Watchmakers say they are more than repaid for the slight difference in price thru its long-lasting and quick drying. They contain no tetrachloride, no cyanide and no alcohol and will not spot, stain or rust even the tiniest parts. "Factory-finish" is the final result.

5. L & R Watch Cleaning Machines are built completely in our factory—not assembled from parts purchased from other manufacturers. Though L & R Machines are guaranteed, if parts are needed for later replacement, our complete stock assures you that they are always available.

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NO PEGWOOD!
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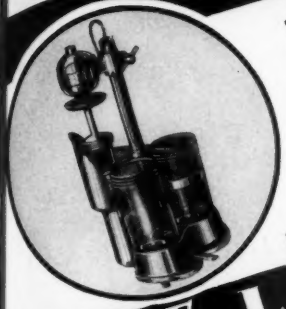
NO SAWDUST!

CLEANS—DRIES—POLISHES
in LESS than 4 MINUTES!

All equipped with Hamilton-Beach rheostat-controlled AC-DC Motors

The L & R DELUXE $59.50

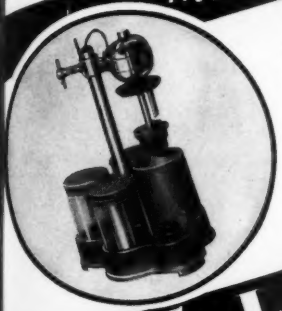


The finest Watch Cleaning Machine built by L & R, featuring a new, vitreous resistance coil that maintains uniform heat for safe, quick drying. Other important features are the "Safety Seal" Jar Top, the heavier thread on basket attachment, patented Key-Shaft for automatic centering basket in jar and the Ball-Bearing arm rest. Finished in polished nickel plate, with spring jar tops.

Complete with an extra basket for cleaning small clocks and jewelry, and one quart each of the famous L & R Solutions.

L & R DELUXE Model with Chromium Plated Disc Jar Tops . . $62.50

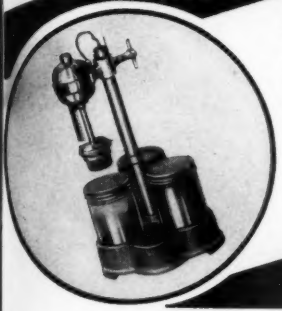
The L & R SPECIAL $42.50



A medium-priced, durable Watch Cleaning Machine having many of the features of the L & R DELUXE Model. The drying unit is operated by revolving the basket, containing cleaned parts, over a high-heat electric bulb enclosed in a metal cylinder. Patented "Safety-Seal" Jar Top is standard equipment. Finished in gold-effect with lay-on jar tops.

Complete with one quart each of L & R Solutions!

The L & R JUNIOR $32.50



An inexpensive machine for watchmakers whose requirements do not call for either of the heavier Watch Cleaning Machines described above. This sturdy model is highly recommended to all watchmakers. Finished in rough silver-effect with screw-on jar tops.

Complete with one quart each of L & R Solutions!

L & R JUNIOR Model equipped with new, patented "Safety-Seal" Jar Top . . $35.50

Thousands of Watchmakers use L & R Solutions for best results!

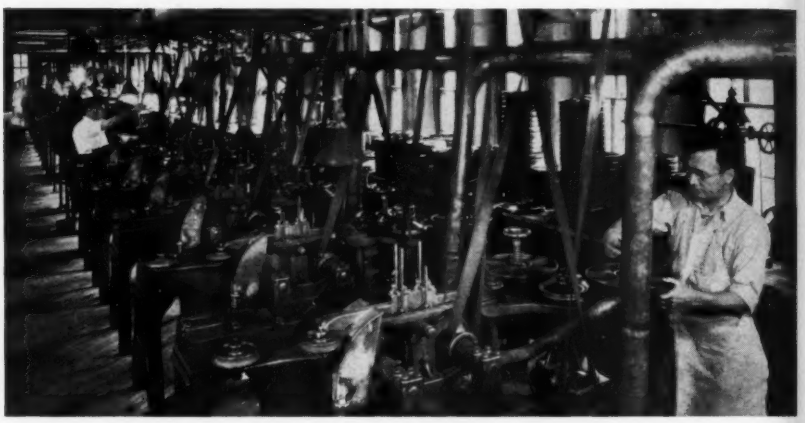
No. 1 CLEANER No. 3 RINSE
Pints 45¢ Quarts 85¢
Gallons $3.00

The Manufacture of Watches

By Percy J. Henderson

CHAPTER IV.

Editor's Note—This is the fourth of a series of articles on the manufacture of a watch as conducted in the factory of the Elgin National Watch Company. We wish to emphasize the fact that this is not an attempt at techincal discussion of the making of a watch but is simply our desire to give our readers some idea of what goes on in the factory.



The Spring department supplies the power plant of a timepiece—the mainspring. Modern machinery, exact in operations, grinds the mainsprings at the rate of 10,000 per day.

AMONG the most important functions of the spring department is the manufacturing of the balance wheel, rightly called the "heart of the watch," the mainspring, which supplies the motive power of the timepiece, and the hour, minute and second hands. Various other parts such as the setting levers, clutch levers, pallets and forks and practically all the watch material used in the plant, are punched out of strip metal on automatic presses in this department.

The balance wheel is composed of two metals, brass on the outside of the rim and steel on the inside with an arm of steel into which the staff is staked. The proportions of metal in the rim are three of brass and two of steel. There are forty-five different mechanical operations, five gaugings and eight inspections in the manufacture of the balance. As some of the operations, such as the drilling, tapping and countersinking of the twenty-six holes in the rim, are repetition, it requires 148 operations before the balance is completed for delivery to the escape department. In that department the staff is staked in and other operations performed before the finished balance is ready to insert in the watch in the timing department.

The function of the brass and steel rim is to bring the weight of the rim closer to the center of the balance with increases in temperature, and farther away with decreases in temperature. As brass expands more than steel with increased temperature, the rim bends inward to the center of the oscillation—thus compensating both for its own expansion and that of the hairspring by diminishing the inertia of the balance. As heat diminishes, the opposite effect is produced.

The first operation in the manufacturing of the balance wheel is the making of the centers from rods of steel four feet

in length. Automatic machines turn the steel to the proper thickness and diameter, and drill and bore the center hole. This blank, after proper inspection and gauging, is staked in a copper capsule and a ring of brass inserted between the steel center and the capsule. Then the brass ring is brazed to the steel center in an automatic furnace. Next, the balance is heat-treated to the proper hardness.

After shaving the capsule off the outside, the balance is faced on both sides to a certain thickness and shaved to a certain diameter, after which the brass is rolled to the proper hardness. It is then shaved again to a smaller diameter and placed in magazines to be processed on automatic machines. These machines face both sides and recess one side. Following this, the balance is surface ground and placed in magazines to have the inside of the rim cornered. After broaching the center hole to size, the inside of the rim is turned on semi-automatic machines to an accurate diameter, leaving a thin wall of steel on the inside of the rim. The balances are now run on a machine to determine if the inside turning is the correct diameter and is concentric to the center hole.

The arm is now punched, twenty-six holes are drilled through the rim, and the inside of the rim and the sides of the arm are profiled. After grinding the arm to thickness and beveling the corners, the balances are cemented on blocks and the backs are ground. Removing them from the blocks, the rim is turned to a certain diameter, leaving the correct proportion of brass and steel in the rim so as to allow for the compensation of heat or cold.

Now the holes are countersunk on the outside of the rim and threaded. They are then cemented on blocks, ground to height and the faces glossed. After gauging the height of the rim and the thickness of the arm, twelve screws are placed in certain holes in the rim and each balance is weighed on a special scale. If the balance weighs below a certain standard, two screws are added and if it weighs above this standard, two screws are removed. The balances are then placed in boxes in lots of one hundred and delivered to the escape department.

The mainspring, which supplies the motive power to the train of a watch, is made from the finest grade of steel obtainable. This steel is purchased in coils three inches wide and from 1,000 to 1,500 feet in length. The steel is slit by machine into from thirteen to sixty-four strands, depending on the width spring being made, in one operation. At the same time, it is recoiled on spools, ready for the next operation of hardening. While being hardened, it is again recoiled for the next operation of rounding the edges. They are then broken up in the proper lengths and the ends are annealed. The springs are now wound in small rings in groups of six to twelve according to size.

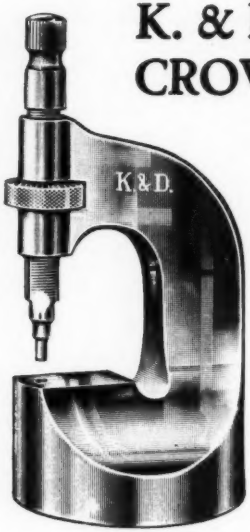
After tempering the springs in an electric furnace, they are loaded into vises, the edges are ground and polished to a certain width and the flat sides are also ground and polished to a certain thickness. Next, the springs are gauged on a machine which indicates the thickness to the ten-thousandths of an inch. All springs are gauged in at least two places and the small sized springs that vary more than one ten-thousandth of an inch over or under the standard thickness, are discarded.

Both ends of the springs are now annealed so holes can be punched for the barrel arbor hook and the barrel arbor brace. The ends are buffed and the entire spring is cleaned and made ready for the final coloring. This is done in an electric furnace. The arbor end is then shaped and the spring is coiled to obtain the resilient shape. The holes are punched in the brace end of the spring so the brace can be riveted on, and the brace is crimped to fit the barrel. After inspection, they are delivered to the train department where they are wound and placed in the barrels.

—THE WATCHWORD.

Eight New KENDRIC

K. & D.-HANSEN CROWDING TOOL No. 14



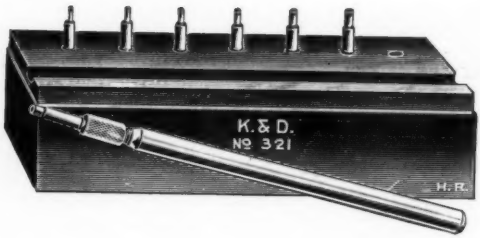
WILL REMOVE AND REPLACE FRICTION JEWELS easily and accurately WITHOUT MARRING JEWEL or SETTING. FOR USE ON SWISS AND AMERICAN MOVEMENTS.

A small Power Press with a Gauge for ascertaining proper depth before removal of old Jewel.

This tool will also be found **useful for tightening Cannon Pinions and replacing Watch Hands.** Your present K. & D. Punches and Stumps will fit this Crowding Tool.

Printed instructions with each tool.

Price $9.25



K. & D. No. 321

Set of 7 Bracelet Jewel Sub-Punches and Holder. Fits all K. & D. Staking Tools, and also the K. & D.-Hansen Crowding Tool. An efficient set for various purposes, especially the following: **To fit the new type Friction Jewels now used on new style Swiss Plates. To fit Jewels in American Wrist Watches. As a Jewel Pusher to remove broken Jewels from Plates** using either Friction Jewels or American Jewels in Settings.

Price $1.80

K. & D. No. 322

Set of 10 Bracelet Jewel Setting Reamers and Holder. Fits all K. & D. Staking Tools, and the new K. & D.-Hansen Crowding Tool. Useful in **reaming out and enlarging Settings for new type Swiss Plates that use Friction Jewels.** It can also be used on all Swiss Bracelet Plates that require reaming or enlarging.

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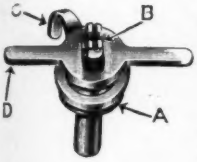

ADJUSTABLE STUMP ROLLER REMOVER

Base Pin "A" fits Staking Tool Die Hole. **Bent Arm "C"** fits nearest Die Hole preventing Stump from rotating. **Jaws "B"** are adjusted for gap by means of **Wrench "D".**

No. 305-B for Bracelet and Baguette Rollers.
No. 305-C for larger size Rollers.....**Price Each $1.20**

Punch No. 8 for use with **No. 305-B,** and **Punches No. 9** and **No. 10** for use with **No. 305-C** are in **Staking Tool Sets No. 16-B and Inverto. Sold Separately**.....**Price Each .35**

Jaws for No. 305-B and No. 305-C. Sold Separately.....**Price Each .60**

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New No. 317 ROLLER REMOVER SET

Now consists of **Punches Nos. 8, 9, 10** and **No. 305-B** and **No. 305-C** Roller Remover Stumps in a round Wooden Box, as illustrated. The Adjustable Stumps cover a much wider range than the former 4 solid Stumps.....**Price per set $2.75**

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No. 323 & 323-B---CANNON PINION CLOSING PUNCH AND STUMPS

Fit 5 cornered Broach in Cannon Pinion. Place Cannon Pinion in **"V" Slot** of special Stump. Slots in Stump guide the special Punch on Staking Tool.

No. 323 for Regular Sizes.
No. 323-B for Bracelet and Baguette Sizes.....
.....**Price, either size, .60**

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NEW YORK CITY

H. I. of A. and U. H. A. of A. Joint Meeting of Executive Boards

The Executive Boards of these two organizations will hold their joint meeting in Cincinnati, Ohio, Friday, April 23rd, to endeavor to bring about some mutual co-operative measures in the interest and welfare of all watchmakers in these United States of America. This meeting will be confined to members of the executive boards.

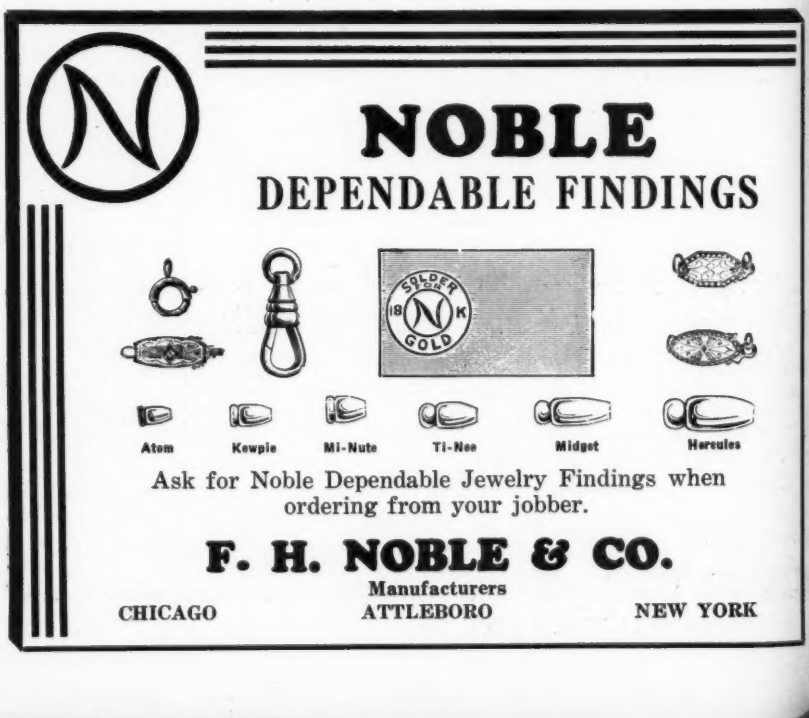
Those eligible are:

H. I. A. Executive Committee—Harrison F. Babcock, Pres., Cleveland, Ohio; E. H. Hufnagel, Vice-Pres., Mt. Vernon; Jacques LeRoy, Vice-Pres., New York; W. C. Donnelly, Vice-Pres., Baltimore, Md.; S. George Cochron, Vice-Pres., Nashville, Tenn.; Roland C. Wilson, Vice-Pres., San Diego, Calif.; John J. Bowman, Treasurer, Lancaster, Pa.; Ralph E. Gould, Sec., Washington, D. C.; Frank C. Beckwith, Lancaster, Pa.; Fred G. Gruen, Cincinnati, Ohio; Frank Urie, Elgin, Ill.

U. H. A. A. Executive Board—Frank Foegler, Pres., Cincinnati, Ohio; Thomas J. Fagan, Vice-Pres., Boston, Mass.; Elmer B. Schneider, Treas., Toledo, Ohio; Orville R. Hagans, Exec. Sec., Denver, Colo.; Joseph A. H. Voss, Historian, Cincinnati, Ohio; A. R. Raphael, Exec., New Haven, Conn.; Ernst Wetteroth, Exec., Kansas City, Mo.; H. W. Schaefer, Exec., Indianapolis, Ind.; H. Flotemersch, Exec., Bellevue, Ky.; L. W. Heimberger, Exec., Columbus, Ohio; John J. Lacher, Exec., Omaha, Nebr.

The reason for holding this joint meeting in Cincinnati is to have the Boards convene in a city away from the influence of convention and possible interruptions.

Mention "The American Horologist"



Manufacture of Watches in Foreign Countries

Answers received to inquiries regarding the manufacture of watches in foreign countries has brought the following replies from:

Robert Frazer, American Consulate General, 18 Cavendish Square, London, W. I., England:

"The watchmaking industry, insofar as making complete watches, including the parts thereof, is concerned, has almost disappeared in England, although in former times it was of some importance in one section of London and in one of the provincial towns. It is believed that the cases of some watches purporting to be of English manufacture, all the parts, and in some instances, the complete watches, are manufactured by the Tavannes Watch Co., Chaux-de-Fonds, Switzerland."

* *

F. B. Cowen, secretary of the British Horological Institute, Ltd., 35 Northampton Square, London, E. C. I., quotes in part as follows:

"I understand there are the following watch factories engaged in the watch manufacturing business in this country, viz:

Making complete watches	2
Making watch parts	7
Assembling watches made abroad	1
Approximate number of hands employed in the industry	300"

* *

Walter A. Leonard, American Consul General, Stockholm, Sweden, quotes in part as follows:

"1—Sweden is not a watch manufacturing country. There are no watch factories in Sweden. Watches sold in Sweden are imported, the chief country of origin being Switzerland. I may remark that clocks are made in Sweden on a small scale, but I note your enquiry pertains only to watches.

2—It has been ascertained that there are two factories in Sweden making watch springs, but they are said to be small.

3—There are no factories in Sweden which build up watches made by other factories.

4—In view of the information given above, it is evident that there are no employes in Sweden engaged in the manufacture of watches. There are no statistics giving the number of employes in factories making watch springs, but it is estimated that the number would not exceed fifty."

* *

The following from Fachgruppe Uhren, Geschaftsstelle, Schwenningen, Germany, quoted in part:

"1—There are twelve factories in our country that are making complete watches.

2—There are about ten factories that are merely making parts.

3—There are about 150 factories that build up watches from materials made by other factories.

4—There are employed in the watch industry, about 6,000 people."

* *

The following from Mr. A. Vladmirsky, Amtorg Trading Corporation, 261 5th Avenue, New York:

"In the U. S. S. R. there are two watch factories, First Watch Factory, and Second Watch Factory, both located in Moscow.

The First Watch Factory now produces about 500,000 jeweled watches, (pocket watches) per year, all parts, including the cases being made in the factory. The jewels and mainsprings come from the outside.

The Second Watch Factory is a clock factory. Its annual production is about 3,500,000 weight driven clocks, 600,000 alarm clocks, 300,000 eight-day clocks (wall) and 50,000 electric clocks. All parts for these clocks are made in this factory.

In both factories about 6,000 workers are employed.

There is a special school in Moscow

for training about 200 young people for the watch industry."

* *

The following from J. Schloesing, French Trade Commissioner, quoted in part:

"The watch factories are mainly located in the eastern part of France. Besancon, main center, makes complete watches, mostly in platinum, gold and silver.

Montbeliard, Morteau, Seloncourt, Villers le-Lac and Beaucourt make the plain metal or silver watches; Villers-escapement accessories are made in Maiche and Charquemont; pinions and wheels come from Cluses and a few little towns in the neighborhood. Paris makes the pocket watches and arm-band watches.

The watch cases are made in Besancon, (platinum, gold and silver), Morteau (common metal and silver) Charquemont and Damprichard, (metal and gold plated) Paris (platinum and gold).

Some parts of the watch are exported to Switzerland, such as the escapements, pinions and other accessories. For many years the Maiche (Doubs) districts produced assortments of escapements, which are exceptionally cheap. The manufacture of semi-finished articles, spare parts and pinions of the Haute-Savoie district (Cluses and neighboring towns) also deserves a special mention.

The watch, complete, is exported to England, Belgium, Central Europe, Spain, Canada and South America.

Exports in 1934:

	Value in Frs.
Watch movements	358,000
Other movements	456,000
Watches	1,063,000
Unfinished watch cases	3,000
Watch cases, finished	342,000
Clock cases in wood	203,000
Clocks and alarm clocks	7,118,000
Chronometers	30,000
Clocks for buildings	118,000
Watch accessories	1,407,000
Other accessories	567,000
Total	11,665,000"

The Electric Clock

(Continued from Page 12)

hands is accomplished, in some clocks, through worm gears while in others spur gears are used. Some have a revolving indicator to show when the clock is running, while others do not. Most are provided with self-oiling rotor bearings and in some these bearings are self-aligning. There is very little to get out of order in the electric clock, except the usual trouble with worn bearings, of which the center arbor bearing causes the most trouble. Many of these clocks are noisy. Some of this noise comes from the gearing and may be quieted, temporarily at least, by using a heavy, clinging grease. The humming noise comes from the magnets themselves and is caused by the vibrations of the laminations of the pole pieces. For this reason the movement is usually mounted with rubber cushions between the frame and the case to prevent the vibrations from being communicated to the thin case which would amplify the sound of these vibrations considerably.

The Prince of Conti discovers the penalty attached to old age: "It is time for me to retire. Formerly my civilities were taken for declarations of love, but now my declarations of love are taken for civilities."

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Crosscurved Construction Preserves Their Power and Resilience

Quality Backed Up By Service

We have made, to orders for one only or one quarter dozen, a thousand odd sizes of mainsprings for watchmakers who needed them.

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Order from Your Jobber

The Great Ohio Valley Flood

BY FRANK FOEGLER

Cincinnati has experienced the most disastrous flood in its history. On the eighteenth of January the Ohio river rose to a flood stage of fifty-two feet in Cincinnati. For several days following the rise was so gradual that it did not indicate the magnitude of the flood which was developing.

When the announcement was broadcast by the authorities that all available dishes should be filled with water for drinking and cooking, we realized the seriousness of the situation. By Monday morning the electricity and water service had been discontinued. The greater part of Cincinnati would not have suffered from this disaster had it not been for the flooding of the water works and the electrical generating plant. With these

The river has reached the flood stage of sixty feet many times, but only once before during the time that records have been kept, has it reached seventy feet. January 24th, now remembered as black Sunday, was one of the dreariest days that I can remember. It was dark and the rain fell in a continuous downpour all day. We sat around the radio and as the news of the rapidly rising river was broadcast fear crept into our hearts for the unfortunates who lived in the district exposed to the raging waters.

two main supports of the city out of order, everything came to a standstill.

Few of our members have had real material loss aside from the loss of time. One of our members, Bill Grogan, who resides in Dayton, Ky., a suburb of Cincinnati, had his house submerged to the point where the only means of access was through the chimney. The rest of us are none the worse for our experience, and we hope that the government will be able to exercise a better control over the river in the future.

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The latest piece of advertising material created for the association is in the form of a stamp to be affixed to your letters, envelopes, job tags or jobbing envelopes.

Through the use of these stamps greater publicity will be derived, as it will continually keep our insignia before the trade and consuming public.

This medium is such that all members can take an active part in aiding us in advancing speedy recognition.

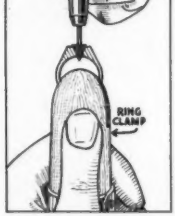
Then, too, it will greatly aid us in building up our advertising fund and general fund, by which your National Association can carry out the many programs and services beneficial to you and your fellow members.

Stamps are sold through your association or guild secretaries or the National office, for 50 cents per sheet of fifty stamps.

FLEXIBLE SHAF
MACHINE

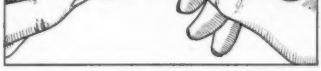
with MOTOR and $1.8
Foot Control Rheostat

Chrome Plated Flexible Shaft and Hand Piece



Excellent for milling setting preparatory to setting stone.

Drills hard to get at places on very fine work.



Removes rust from Watch parts, polishes and grinds.

Once you have this time and labor-saving machine in your possession, you will find it useful in so many ways, you will never want to be without.

A well made tool, st ructed stand hard wear. Motor with b for hanging to hook wi shed. C be fastened to side of b et or w Can also be suspended

- Makes innumerable diffi t impos jobs easy.
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- Solves many engraving p
- Useful for sharpening a gravers other small tools.

No. Y39981. Flexible Shaft Ma with 1/20 Motor, 110-V. AC-DC, foot contr cord and plug..... $19.

No. Y39983. Assortment of bur ar saw, ru disc, etc., as illustrated, for use shaft machine. 12 pieces..... $2.

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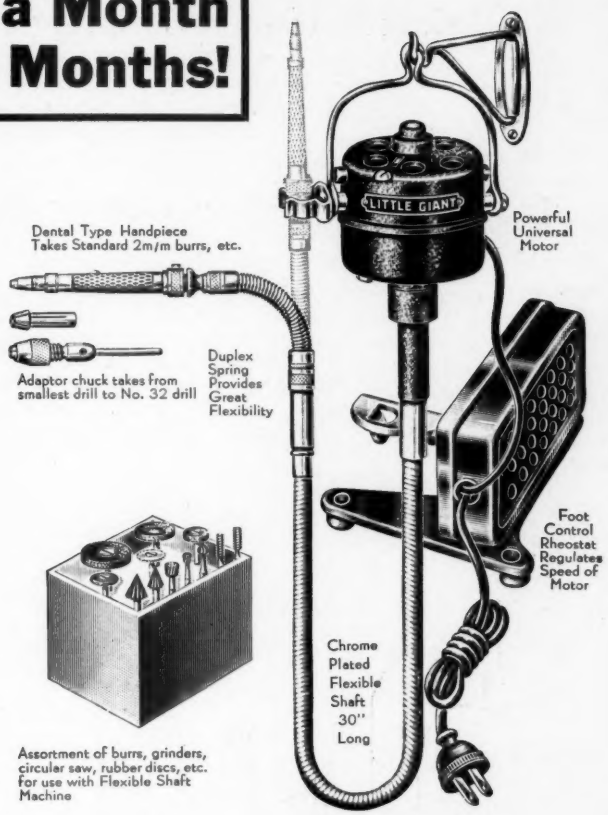
AMERICA'S FOREMOST WATCHMA AND

$1.98 a Month For 10 Months!


Dental Type Handpiece
Takes Standard 2m/m burrs, etc.
Adaptor chuck takes from smallest drill to No. 32 drill
Duplex Spring Provides Great Flexibility
LITTLE GIANT
Powerful Universal Motor
Foot Control Rheostat Regulates Speed of Motor
Chrome Plated Flexible Shaft 30" Long
Assortment of burrs, grinders, circular saw, rubber discs, etc. for use with Flexible Shaft Machine

80

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drills, as well
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MILWAUKEE HOUSTON
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AND JEWELERS' SUPPLY HOUSE

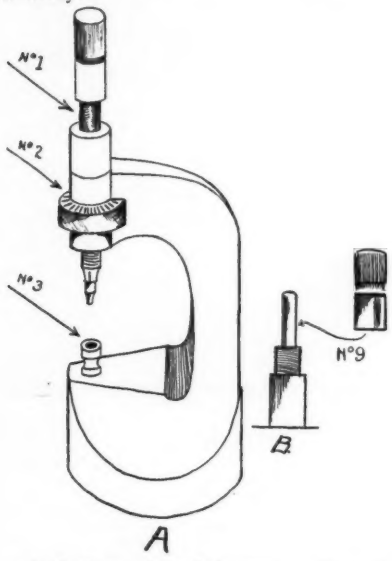
K. & D.-Hansen Crowding Tool

DESIGNED BY JES. I. HANSEN
Member Technical Advisory Board, U. H. A. A.

Jes. I. Hansen

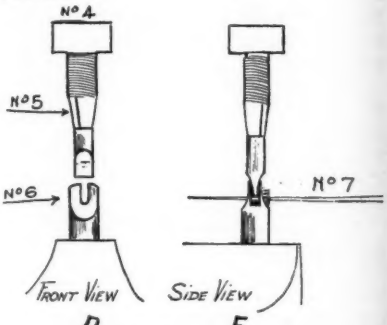
THE AMERICAN HOROLOGIST *published an announcement in its April, 1936, issue regarding Mr. Hansen's latest creation and through this article, interest was shown by progressive manufacturers. Today we are pleased to make further comment on the Crowding Tool and its many practical usages..*

THE increasing practice of using friction jewels and bushings in many of American Swiss watches has created a need for a tool which will easily remove and replace these friction 'held' settings and also enable the workman to replace the jewels easily and accurately.



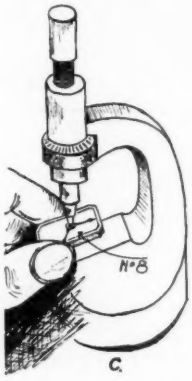
A hollow threaded sleeve, No. 1, passes through the arm of staking tool, the arm of staking tool being slotted so that adjusting nut No. 2 will pass over the sleeve. The raising and lowering of this sleeve is controlled by nut No. 2, which is a micrometer adjustment and so marked. The punch is inserted in sleeve No. 1 and secured by lock nut on top of sleeve.

The sleeve No. 1 is keyed so it will not mar the work by turning while the punch is being lowered or pressed on jewel setting. For removing a jewel, a hollow stump is used, No. 3. If a jewel is to be replaced, a flat faced punch is used so that jewel may be pressed into plate and the stump acts as a stop, leaving the jewel and setting flush with underside of plate, giving the correct end shake. This tool will also be found very handy for tightening friction on cannon pinion, with K. & D. Cannon Pinion Closing Punch and Stump No. 323 or 323-B.



Figures D and E show the method and application for tightening the cannon pinion. The crowding tool will also prove itself valuable for placing the hands on a watch. A small stump is placed in staking tool to support the lower pivot of center arbor and then while pressing on hands, there is no pressure exerted against the jewels which otherwise might have a tendency to move the jewels in their settings, causing too much end shake to the center arbor,

which would naturally stop the watch. Note: Punches and stumps from your present staking tool used in this instrument.



With the Crowding Tool you will avoid many unnecessary wasted moments caused by driving jewels in or out of plates. The Crowding Tool in reality is a small power press which can be gauged for depth by ascertaining proper depth before removal of old jewels. The replacements are quickly and accurately made.

Many jewels have been cracked by the old staking tool method where sharp blows are necessary. This loss of material is saved by using a K. & D. Hansen Crowding Tool. The uses are many.

The tool will pay for itself in the material saved or the accuracy and knowledge of sureness in replacing hands without injury, for the replacement of hands can be watched to the desired depth.

Don't attempt to loosen cap over stake with pliers. The cap turns left.

Don't use hammer on stakes when inserted in tool, which may incidentally injury the threads.

K. & D. accessories for Crowding Tool are sub-punches and holder for small bracelet jewels No. 321 Bracelet Jewel Setting Reamers and Holder No. 322.

This tool with its accessories brings the better watchmakers equipment up to date, enabling him to meet every bench problem in friction jeweling, etc.

Complete listing of these tools will be found in Hammel Riglander & Co.'s advertisement in this issue of THE AMERICAN HOROLOGIST.

Patronize Our Advertisers
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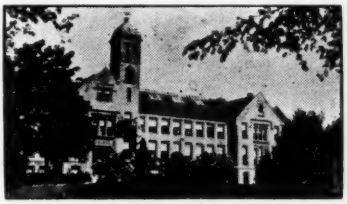
"The Pathway to Success"



WATCHWORK
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STONE SETTING
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Bradley Polytechnic Institute
School of Horology

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Peter Henry & Son

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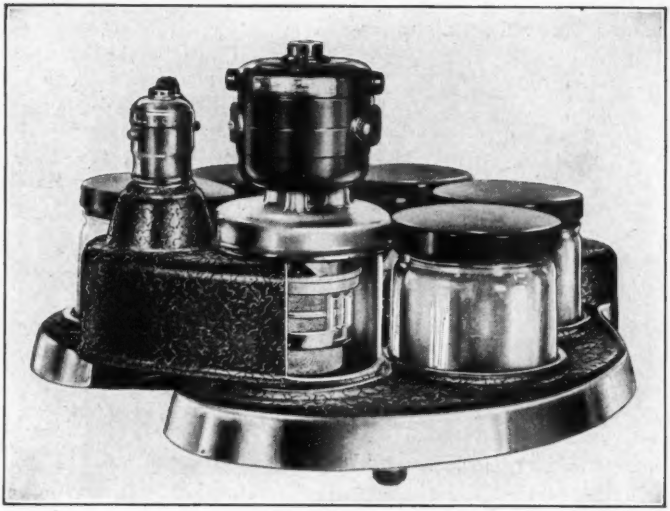
Velvo-Clear Watch Cleaner



(Rear view of machine) Actual photograph of enclosed drying chamber cut away, showing basket and how motor lid clamps down into heated chamber. Short shaft to basket when clamped down takes away vibration.

VELVO-CLEAR WATCH CLEANER IS NOT AN EXPERIMENT

CERTIFIED watchmakers are now using this machine for a better job. Their experience with Velvo-Clear has been the same in every instance —a cleaner, quicker, and less laborious watch cleaning in every watch shop that uses Velvo-Clear.

DISTRIBUTORS WHO SOLICIT YOUR INSPECTION AND PATRONAGE

BAUMAN-MASSA JEWELRY CO.
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BUTTERFIELD BROS.
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HENRY PAULSON & CO.
37 S. Wabash Ave., Chicago, Ill.

E. W. REYNOLDS CO.
3rd Floor, Metropolitan Bldg., Los Angeles, Calif.

The manufacturer guarantees his product to do all we claim it will and that once you install the machine in your shop you would not take 10 times its price if you could not get another.

(Front view) Simple and easy to operate. Automatic adjusting stop over jar.

BASKET

Fine mesh wire basket that encloses trays, carrying disassembled parts of watch into the solution. No parts of the delicate mechanism will be damaged, and the finished job will be superior to one where ordinary methods are followed.

VELVO-CLEAR WATCH CLEANING SOLUTION

NON-EXPLOSIVE—For the finest workmanship and the best possible results we recommend the use of Velvo-Clear Watch Cleaning Solution. Velvo-Clear polishes all jewels and steel parts of the watch without resorting to any hand brushing whatsoever.

Velvo-Clear Cleaning Solution contains no cyanide or any other strong chemicals harmful to any parts. No. 1, grease and tarnish remover, and No. 3, rinsing solution, are available in quart and gallon sizes.

Velvo-Clear Watch Cleaner 4065 HOLLIS ST. OAKLAND, CALIF.

Publicity Tips

By R. E. FISHER, *Nat'l Publicity Mgr.*

Are you taking advantage of your free newspaper publicity possibilities?

Is your Guild sending delegates to the State Convention?

They surely are, so a letter like this will get your Guild some publicity:

City Editor,
Podunk Daily News.
Dear Sir:

At the last meeting of the Podunk Guild of the State Watchmakers Association, the following were selected to attend the State Convention to be held in Junction City, March 31, 1937:

John Smith, Henry Jones and Howard Doe.

They will represent our Guild of 50 members at this important meeting, which will be attended by over 200 skilled watchmakers from all over the state.

Yours very truly,
Pub. Mgr. Podunk Guild.

This is just a rough outline of what should be done; of course the city's name and figures are mythical, but an article like this is news and read by the public who are impressed with the fact that there is a Guild of skilled watchmakers in your city and that there is also a State Convention.

It is well to also mention your Guild as an affiliate of the U.H.A.A.

When these gentlemen return a similar letter should be sent to all local newspapers that they just returned and give a sketch of what they accomplished, especially in behalf of public interest and welfare.

And don't forget, the same thing happens when you send delegates to the National Convention, so either write or call the city editor and let him know about it.

THE WATCH AND CLOCK MAKER

published monthly in England. A review of all that is new and good in Horological Science with particular attention to the needs of the technician. Editor, Arthur Tremayne; Technical Editor, T. R. Robinson. World wide subscription one dollar yearly postfree. N. A. G. Press, Ltd., 26, Old Street, London, E. C. 1, England.

Detrimental Practices of United States Government

We of the watch and jewelry industry continually seek elimination of those practices which are detrimental to our industry. From many sources we receive complaint regarding the government's contribution toward aiding unethical competition.

February 26, 1937, the United States Marshal caused to be auctioned off several hundred watch movements and watch parts, which were forfeited to the United States for violation of the Customs Laws.

The legitimate channels of business, composed of manufacturer, distributor and retailer, vigorously disapprove of such practice.

We Do FIVE things WELL

1—In-2-Sta Watch Crystals; and magnifying Rock, Flat Tops, as well as all special glass jobs.

2—Fine dial refinishing, new dials to order; and general dial work.

3—Authentic 14-karat, gold-filled bracelet watch crowns, platinum shell, solid gold and platinum.

4—Complete coverage for mainsprings, American and Swiss, featuring The Monnat Geneva Resilient Mainsprings.

5—A complete line of genuine imported English Watch Straps.

* * *

DUTCHER BROTHERS

Incorporated

10 West 47th Street
New York City

Balance Truing—Hamilton Watch Company

PLEASE NOTE: This Technical Data is designed to be of service to watchmakers.

BALANCE truing is accomplished by means of a pair of balance truing calipers, balance truing wrenches, parallel pliers and brass lined tweezers.

Balance truing calipers are so constructed that the balance will be supported on the cones of the pivots as shown in Fig. 1 in which (A) is the conical portion of a balance pivot, (B) is the stump of the balance calipers (C) is a hole in the stump to allow freedom and to prevent the stump from becoming clogged with dirt which in time would mar and break the pivot.

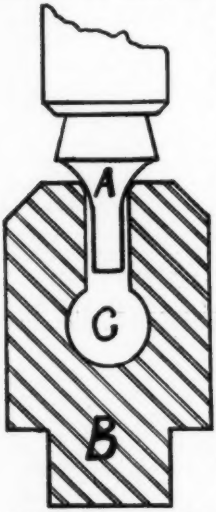

Figure 1—Stump for Balance Calipers

The balance calipers are provided with an index which indicates when the balance wheel is true, in the round or flat. This index must be so arranged that it will be easily adjusted to different size balances and to retain an easy friction at all times, so the index can be brought close to or far away from the balance quite rapidly.

The calipers are usually held in the left hand as shown in Fig. 2, for truing in the flat, and as shown in Fig. 3 for truing in the round. A certain grasp is taken with the thumb, 2d, 3rd and 4th fingers, leaving the first finger free to move the index forward and back. The Method of holding the calipers is very important. So they can be easily rolled or shifted in the hand from the flat to the round position. Take special notice of the positions of the calipers in Figs. 2-3.

In the actual work of truing the balance there are three important rules to follow that will be of great assistance to those who desire to become expert balance truers.

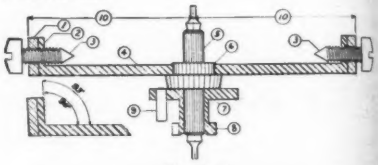

Figure 9

(1) Brass part of Balance Rim; (2) Steel part of Balance Rim; (3) Gold Mean Time Screws; (4) Balance Rim (steel); (5) Balance Staff; (6) Staking Burr; (7) Impulse Roller; (8) Safety Roller; (9) Jewel Pin; (10) Radius of Balance Arm.

1. True the balance in the "FLAT."
2. True the balance in the "ROUND."
3. Start at the arm and work towards the cut, both in the round and in the flat.

Truing in the Flat

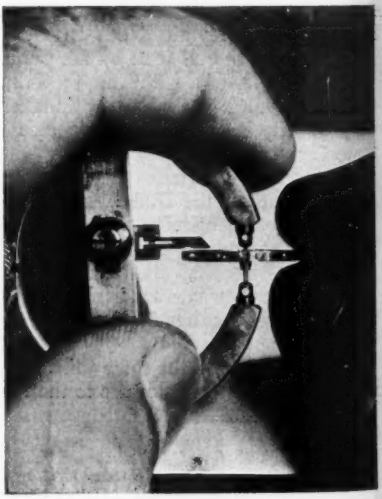

Figure 2—Position for Truing in the Flat

In Fig. 2 the calipers, index, balance and hands are shown in correct position

for truing in the flat. Start at the arm, adjust index, turn the balance slowly with the first finger of right hand so the height can be determined. Make both arms absolutely the same height, by pressing the low arm up or the high arm down. To raise the low arm, place the soft part of the thumb under the arm and with a firm pressure force the arm up. To lower the high arm place the soft part of the first finger on top of the arm and with a firm pressure force the arm down. *Caution*—always keep a firm pressure on the calipers with the left hand so they will not open up, for if they should open, you will break the balance pivots.

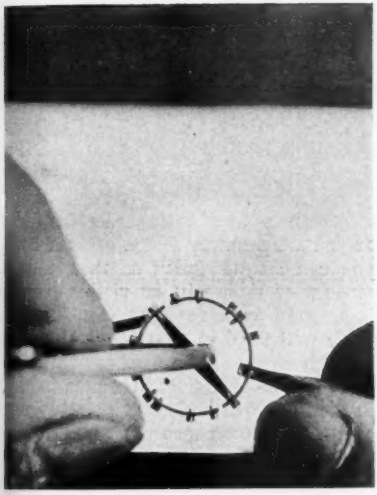

Figure 3—Position for Truing in the Round

Some balance staffs will be so long and thin that it will not be safe to raise or lower the arms in this fashion, for fear of bending or breaking the staff. When this condition is met, place the staff and balance in a staking tool as for staking on a new staff, and with a firm pressure on the punch with the left hand, you can bend either arm up or down without fear of breaking the staff. Place balance in calipers and proceed.

With both arms the same height, start at an arm, turn balances slowly toward the cut. If both balance rims follow the index as shown in Fig. 4 (a) the balance wheel can be considered true in the flat. If the space between the index and balance rim increases as at (b) Fig. 4, it indicates that the balance is out of true in the flat and the rim will have to be raised so as to be absolutely the same height as the arm. Fig. 4 illustrates four sketches of the balance rim looking at it edgeways as though you were seated at your bench and looking at the balance in the position shown in Fig. 2. The index is shown at 1-2-3-4-5-6-7, and indicates where the balance rim is out of true, as the balance wheel is being turned in the calipers from the arm position toward the cut. The fingers of the right hand, Fig. 2, show the correct method of bending the rim up or down and by constant practice it will be possible to remove very short bends in this manner.

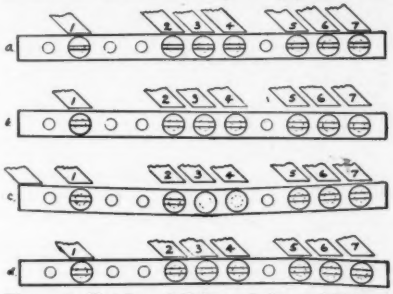

Figure 4—Sketches of Balance Index and Balance Rim

Suppose the index, Fig. 4c, shows the rim to be low at screw 3 and as you proceed towards the cut the rim rises at screw 7 to the same height as at the arm, or even higher. This can be overcome by bending the rim up with the thumb and first finger, keeping the soft part of the thumb in such a position that it will have a tendency to retain the arm at its same height and at the same time raise the low part of the rim. The end of the rim will now have been raised still higher, and by moving the thumb and first finger forward and grasping the rim in such a manner that by a rolling pressure of the first finger over the support of the thumb the end of the rim can be

thrown downward. *Constant practice of this method of rolling the fingers is absolutely necessary.* Again when the middle of the rim is lower than the arm or end of cut, Fig. 4c, it can be corrected by grasping the rim with thumb, first and second fingers, having the thumb support the low part, then with first finger at arm and second finger at cut, squeeze upward on the thumb; this will lower each end and raise the middle. Never put a balance wheel on a block of any description and attempt to punch out the bends, you will only ruin the balance.

The thumb nail and first finger nail can be used with good results in removing sharp bends or kinks. This method of using the fingers for practically all of the truing in the flat is followed in all the watch factories where speed and accuracy are absolutely necessary.

In Fig. 4d, the index is shown at 1, 2, 3, 4, 5, 6, and 7. The rim follows the index perfectly up to the 5th screw. Here

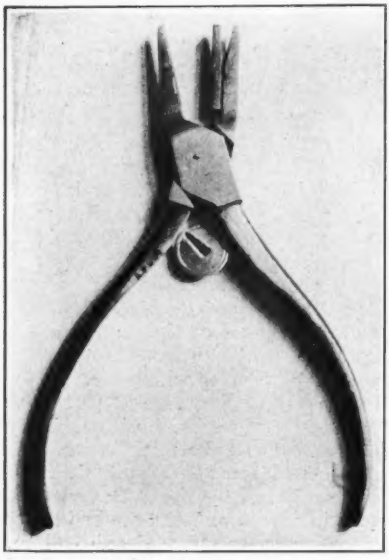

Figure 5—Parallel Plier

the end of the rim takes an abrupt downward bend, and at the 7th screw the space between index and balance has increased. Remove balance calipers, place in parallel pliers (Fig. 5), allowing end of rim to extend over the ends of pliers just a sufficient amount so as to support the rim in the middle of the kink, bend the rim up with brass tweezers. By the same reasoning several kinks can be followed up from the arm towards the cut and removed as you go. It is a hard task to put in words all of the moves and bends that can be resorted to, but to the man who really desires to master the art of balance truing, constant practice on old balances is necessary. With an old balance under observation you need have no fear but strike out boldly, bending the rim up, then down, then raising the middle. Practice constantly, using all of the finger movements that you can figure out.

Truing in Round

The length of the arms can be determined by holding the calipers as in Fig. 3 and having index set accordingly. Turn both arms of the balance so they will be brought directly under the index. If you are properly seated at your bench you can set the index so that a small amount of light will be visible between index and balance rim. Get this distance well fixed in your mind, then turn to other arm. If the arm is shorter the light will be greater. If the arm is longer the light will be less or possibly none at all. The short arm must be stretched to make both arms exactly the same length. To stretch the balance arms, remove the rollers and place the short arm on a flat steel stump of a standard staking tool, select a punch that has been made for this purpose, and bring the punch close to the staff, having the balance arm between the punch and stump. The revolving disc will have to be set so that the punch will come in contact with the balance arm, close to the balance staff. Some practice will be required to do this job successfully, because if too hard a blow is struck the short arm will be converted into the long arm and then the other arm will have to be stretched. It is much better to give

light blows, then try in the calipers to determine the result. If not enough, stretch again, always bringing the punch at the same place so as not to unnecessarily mar the balance arm. If the stretching operation is performed in this way the mark thus made will be on the lower part of the balance arm and when the rollers are replaced will be almost invisible.

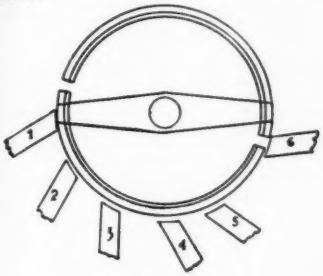

Figure 6

When both arms are true, turn the balance slowly, from arm to cut. If the space between the index and arm increases or decreases it indicates that the balance is out of true in the round at the point where the rim fails to follow the index. Study Figs. 6, 7 and 8.

Always true from arm towards cut, and eliminate all bends as you go. In Fig. 3 the balance wrench is placed over the rim spanning a screw; it is possible now to bend the rim from this point so that the portion of the rim from this point towards the cut can be carried in or out.

Suppose when turning the balance from the arm to the cut, that the rim gradually bends inward as indicated by the index No. 4 in Fig. 6; and from this point the rim gradually bends outward. The rim must be grasped slightly beyond the arm and bent outward. This, if successfully done will make the rim true from the arm to index 4: At this point it will be necessary to grasp the rim with the balance truing wrench and bend the rim inward. These are two bends necessary to correct the condition shown in Fig. 6. In Fig. 7 the rim follows the index to the point indicated by index No. 2. From this point on towards the cut it gradually bends inward. This will require one bend at point 2. Fig. 8 shows a rim badly out of true. At index 2 the rim bends inward towards index 3, from this point it bends outward to point 4, and from

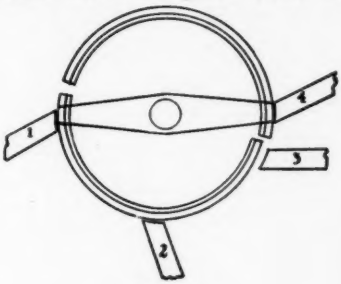

Figure 7

index 4 it bends inward to point 5. This condition will require three major bends, one bend at each index, 2-3-4. It may be necessary to do considerable touching up with a balance of this nature, and here is where a good eye and a fine touch is required to make a nice finished job.

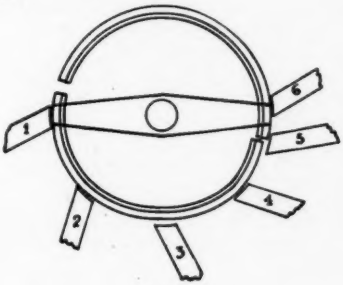

Figure 8

In using the balance wrenches great care must be used so as not to twist the rim upward or downward. This will create the double error of throwing the balance out of true in the flat, and also of putting in a kink in which two portions of the rim are not laying in the same vertical position. This can be explained by considering Fig. 9 in which (1-2) is the rim in cross section, the 93° angle indicates that the rim is not square

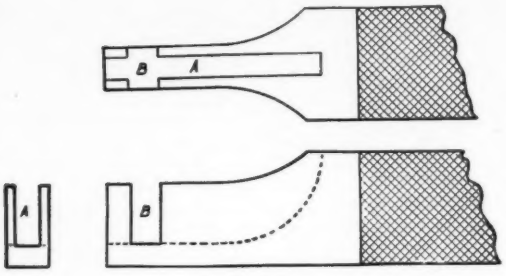

Figure 10

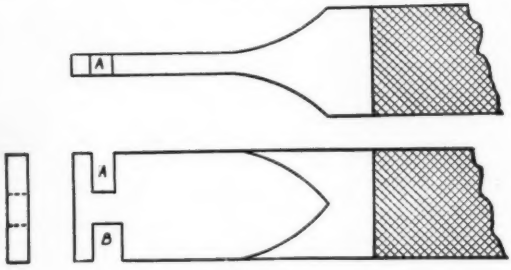

Figure 11

with the arms. If a wrench of the type that straddles a screw is placed over the meantime screw and the end bent downward, it will cause the balance rim to be changed from the true vertical position to a position as indicated by the 93° angle. Upon trying the balance for true in the round, this arm would appear longer than the other one.

Some balance truers take advantage of this condition, and bend the Rim 1 and 2 so that the top part is carried further away from the balance staff. The end at the cut will be raised quite high, and by holding the arm in a pair of parallel pliers the end of the cut can be bent down. This accounts in most part for balances that are met with, that seem impossible to true. One or two of these out of vertical conditions make a very poor balance wheel.

On high grade balances the index should indicate that the balance is true both on top and bottom. That is, in truing the balance as previously described, the balance is placed in the calipers in the same position that it would have in the watch, collet shoulder up and roller down. Now turn the balance end for end, having collet shoulder down and roller up and deterinme if balance is perfectly true. By so doing you will determine if the balance rim is laying in the same vertical position throughout. While the above statement is a theoretical truth, it is advisable on general watch work to true the balance with the index on top, because this is the condition originally established, and the side that is visible when running.

Fig. 3 illustrates a balance truing wrench placed over a balance screw. Details of this wrench are shown in Fig. 10 in which two slots (A-B) cut transversely only can be provided so as to fit balance rims of various thickness.

The Builder

We are all blind until we see
That in the human plan,
Nothing is worth the making, if
It doesn't make the man.
Why build those cities glorious
If man unbuilded goes?
In vain we build the work, unless
The builder also grows.

—Edward Markham.

Abbott Lawrence Lowell, President Emeritus of Harvard University: "No wonder there is a lot of knowledge in the colleges—the freshmen always bring a little in and the seniors never take any away."

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Genuine PS Stubs Precision Files

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From two centuries ago, when the firm of Peter Stubs was founded, right to the present day the name of Peter Stubs has been established and associated only with those products of the highest possible standard.

The enormous world-wide demand for Peter Stubs Files is due entirely to that uniform standard of quality—a standard by which all others are judged.

Such a reputation for quality is obviously no mere accident. It is the result of the accumulated thought, care and practice of generations of highly skilled craftsmen over a period of nearly 200 years.

SPECIFY PETER STUBS FILES
and have that assurance of quality and dependability you have a right to expect.

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THE BOGGS WATCH CLEANER

The Boggs Watch Cleaner is unlike any other. It is practically two machines in one—the combination of a chuck and a basket. It is simplicity from start to finish. Has an induction motor, no spark, no rheostat, permitting the use of pure gas for rinse fluids.

Our patented eccentric method does the cleaning trick.

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Price $35.00

Three Weeks' Free Trial Is Yours for the Asking!

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C. L. BOGGS COMPANY

301 Prospect Avenue **San Francisco, Calif.**

Parade of the Nation's Clock

This clock was designed and constructed by the Bily brothers during the year 1933-1934. The clock is 9 feet 6 inches high and 40 inches wide. It is carved in butternut wood and white oak wood, the globe and figures of hard maple. There are 36 figures carved in wood representing the nations in their native costumes. The globe with its figures revolves automatically with a spring movement.

Mr. F. L. Bily and Joseph Bily do not construct their clocks for resale. Their creations are built for their own pastime and to interest those people who are especially interested in clocks.

Remember the Almoner

"To pity distress is human;
To relieve it is Godlike."

When notices for dues are mailed out, a small envelope is sometimes enclosed for you to return your contribution to our Almoner.

Benjamin Franklin said, "If your riches are yours, why don't you take them with you to t'other world?"

Be mindful of the admonition of Albert Pike: "When I cannot attend, I will not withhold my contribution for the relief of the poor."

Use the envelope enclosed in your envelope to forward your contribution to our Almoner.

Prompt payment of dues is essential for organization efficiency.

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No. 2—100 assorted styles, colors and sizes of Bracelet Crowns.....$0.95

No. 3—1 gr. Fancy Shape Crystals perfect and ready to fit (mixed lot) $1.95

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We have especially prepared a handy Pyralin Material Tray, convenient on your work bench. It is ideal for staffs and jewels when working on repairs. It is FREE with our compliments, just for the asking.

Universal Importing Co.
456 E. 138th St. New York, N.Y.
"GET TO KNOW US"

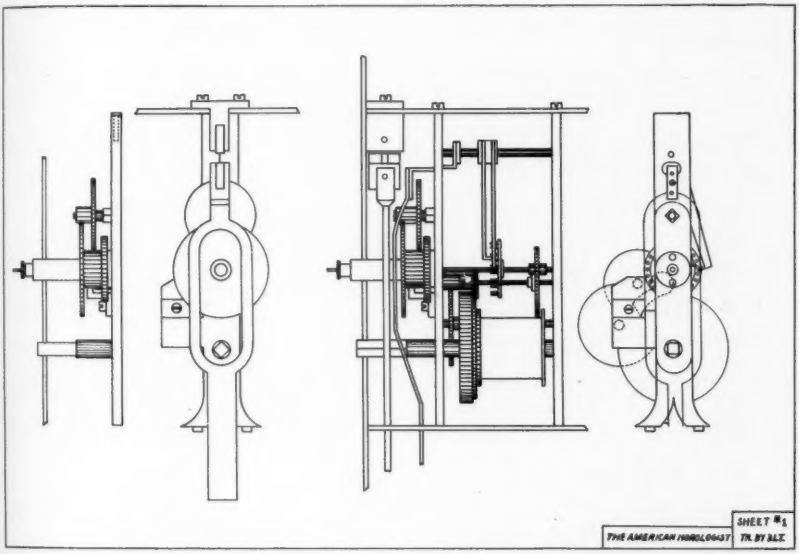
Pin Wheel Escapement Clock

This illustration is from one of the eleven blueprints of working drawings on the pin wheel clock. Demands for working drawings of clock movements have increased to such an extent that we are going to meet these requests as rapidly as possible.

These requests started when blueprints were offered for construction of wooden Columbus clocks.

The pin wheel clock is our first complete set of blueprints for metal construction consisting of eleven blueprints.

The Graham Dead Beat Clock will be available by the time this notice is read, and will consist of eleven working blueprints.



THIRD NATIONAL CONVENTION, APRIL 26-28
Congress Hotel, Chicago, Illinois

WORLD'S STANDARD FOR OVER A CENTURY

GENUINE AMERICAN WATCH MATERIAL SOLD EXCLUSIVELY

JURGENSEN Superior Recoiling Mainspring BPK

450 SIZES

GENUINE SWISS WATCH MATERIAL SOLD EXCLUSIVELY

WITH FINISHED ENDS FOR ALL MODELS OF SWISS WATCHES ONLY
$2.50 DOZEN—$30.00 GROSS

Complete Stock of Jurgensen Main Springs with Unfinished Ends

Sole Agents **BUHL, PEER & KEEFE** 41-43 MAIDEN LANE NEW YORK CITY, N. Y.

National Workmanship Competition

The Third National Convention of U. H. A. of A. will inaugurate an annual event of "National Workmanship Competition" to incite greater interest by the watchmakers in their own craft.

To Horologists wishing to enter their work in this competitive exposition, they should apply at once to Executive Secretary Hagans for application blanks and instruction sheets, which will be forwarded for consideration of postage (.10).

All watchmakers are eligible whether members or not. The finished work will be displayed at Congress Hotel, Chicago, Illinois, April 26, 27, 28, 1937.

FOR AMERICAN WATCHES

SECURITY
THE PERFECT FITTING
MAINSPRING

FOR SWISS WATCHES

USED BY THE BEST WATCHMAKERS THROUGHOUT THE UNITED STATES

Obtainable From All Dealers in Watchmakers' Supplies

Imported Exclusively By

THE NEWALL MFG. CO.

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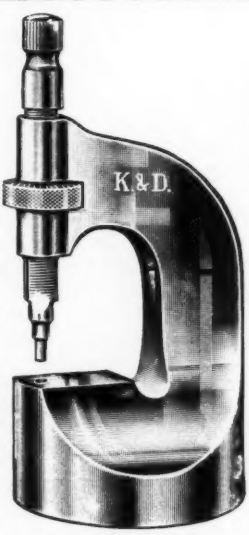
A Measurement Chart Sent Upon Request



K. & D. Hansen Crowding Tool

No. 14—Price, $9.25

If It's New We Have It

Have you seen the new K. & D. Hansen Crowding Tool? One of the most practical and beneficial tools offered to Watchmakers since the practice of friction jeweling. Meet the ever-increasing demand for speed and accuracy. See this tool, own one of these Crowding Tools.

Most Complete Stock of American and Swiss Watch Materials

The speediest service for Rocky Mountain Region. All orders filled promptly by the most competent material men in the West.

Send Your Orders to Cosley for Moto-Shaver, Retail $12.50

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RING MOUNTINGS
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Cosley Jewelry Company

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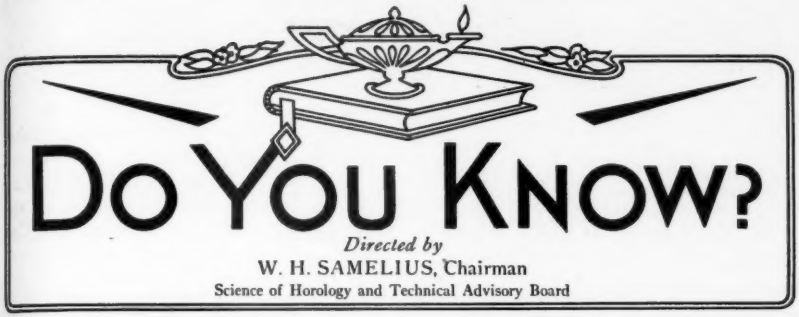

Do you know who wrote the following quotation regarding time?

"If you can fill each unforgiving minute
With sixty seconds' worth of distance run,
Yours is the earth and everything that's on it,
And what is more, you will be a man, my son."

The great English poet, Rudyard Kipling.

The Tourbillion—a term to denote a mechanism in which the balance and escapement revolve around a fixed center in short periods of time, causing it to run through its different position errors in short and regular periods. This system practically eliminates position errors in a pocket watch.

The principal of Dr. Hooke's balance spring was expressed by him in a Latin anagram which can be translated thus: "Ut tensio sic Vis," as the tension is, so is the force, or, the force exerted by any spring is directly proportional to the extent which it is tensioned.

The hairspring of our earliest chronometers were made of soft steel and hardened by rolling. Springs made in this manner were used for many years. Today, the hairspring is hardened and tempered to form.

Half Chronometer Escapement — in which the balance receives impulse alternately from the teeth of the escape wheel and from the fork of the lever. It is a combination of the chronometer and lever escapement.

The Up and Down Indicator on 8-day chronometers was first applied by Thomas Mudge in 1774.

The auxilliary compensation to the balance wheel was a most notable improvement for keeping close time and was first applied by Thomas Earnshaw. This improvement eliminated the middle error to a great extent.

The Waltham Watch Company employed square roller jewels in some of their earliest models.

What is said to be the smallest watch in the world was made in Geneva, 1901. Special tools of all kinds were constructed for the purpose. The watch contained 100 separate parts and weighed one-thirtieth ounce avoirdupois. The hands are one-eleventh and one-twentieth inch in length respectively. The watch was valued at $1,250.00.

It is said the Celestial Kingdom relied on the cat's eye for their time of day. This was shown by the breadth or the narrowness of the pupils, which, of course, was dependent upon the amount of light.

The Chinese had a way to account for this, or they at least thought they did. Anyhow, they relied on the cat's eye to furnish the time.

Just fancy a Mandarin scaling the wall to keep his timepiece from being put out of order by his neighbor's bootjack.

General W. B. Hazen has been credited with promoting the adoption of the standard time system for the United States. A native of West Hartford, Conn., he died in 1887.

Horological Association of Nebraska

The Omaha Guild, Horological Association of Nebraska, held their second regular meeting of the year February 5th. Attendance was exceptionally good, in fact, it proved a record breaker, resulting in renewed enthusiasm throughout the membership.

Our new president, R. P. Kraatz, is forming plans for a vigorous campaign on advertising, publicity and membership. With the appointment of new committees and putting fresh shoulders to the wheel, whole-hearted co-operation is expected.

New appointments are: Advertising Committee—John Lacher, Carl Christensen, C. W. Tiahrt; Resolutions Committee—Fred Schoenman, N. P. Stilling, George Rathbun; Publicity Committee—Edward J. Anderson, L. R. Adams.

Members are looking towards plenty of action from new officers and appointees and are of the opinion vast strides forward will be made.

After an absence of several weeks, because of an appendectomy, Sten Nilson is again back at the bench.

Our meetings are held the first and third Fridays of each month. The meeting of March 5th will be held at the Hotel Chieftain in Council Bluffs.

MORRIS YOST,
Recording Secretary.

Master Watchmakers Association of Oregon

Splendid activity and interest is being shown in our state, members taking care of their association obligations without the usual pressure from the officers. which is most gratifying.

Our meetings are being held regularly. The recent bad weather has not hampered our progress. We hope to have our delegate present during the National Convention in Chicago.

HAROLD SABRO, *Secretary.*

Denver Guild Master Watchmakers Association of Colorado

The first meeting, under its new officers, was held by the Denver Guild on February 12th, with the largest attendance we have had for many meetings. A keen, growing interest was prevalent as the program for the coming year was outlined by the new chairman. This program is to consist mostly of educational and social functions.

A co-operative advertising campaign will be conducted by the members of the Guild. Newspaper space will be taken in leading papers in which there are to be ads using the National Plaque as the key. Constructive references to time and timekeeping and a list of members complete the ad. Each member will display the plaque in his window so that the public might recognize them. This is expected to raise the standard of the craft as no unethical practices will be allowed.

Following the technical meeting, refreshments were served and general bench problems discussed.

D. E. HEIGERT, *Sec'y.*

MODERN METHODS
IN
WATCH ADJUSTING
By Harold Caleb Kelly In Six Parts
Preliminary Consideration, Adjustment to Positions, Adjustment to Isochronism, Adjustment to Temperature, Escapement Adjusting, and Practical Work of Adjusting.
Bound in Cloth, and contains 126 pages, illustrated. Price $2.65 Postpaid
Send Orders to Book Dept.
THE AMERICAN HOROLOGIST

Connecticut Horological Association

February 15th, Mr. A. R. Raphael and associates from the New Haven Guild, went to Hartford, Conn., and aided the horologists of that city to establish a new Guild, to be known as the Hartford Guild. A most enthusiastic gathering was recorded, and Hartford will soon boast of a large membership with the same enthusiasm displayed by all other Connecticut Guilds.

The first annual joint banquet and get-together of the New Haven Watchmakers Guild and Jewelers Association was a tremendous success and was well attended by members of both associations. Mr. A. H. Rosenbeck of the watchmakers was toastmaster and also delivered the introductory speech, telling of the history of watch repairing, the past accomplishments of our Guild and of our plans for the future. He elaborated somewhat on the previous advertising campaign to stamp out the chiseling element and told of another such project that is now in the works.

All of the jewelers in attendance pledged their whole-hearted support to this idea and promised that our previous work would not go unnoticed or unrewarded.

The New Haven Guild expresses their deep sympathy to Mr. A. R. Raphael in his recent bereavement due to the death of his father.

Respectfully submitted,
W. E. SHORT, *Sec'y.*

New London Guild

Connecticut Horological Association Elects New Officers

President, William Poudrier; Vice-President, Harold E. Spicer; Treasurer, Max B. Toelg; Secretary Richard J. Keeney; Trustees, L. E. Kinney, George W. Friswell, and Joseph J. Norvelle.

MARTIN GLUCK & SONS
Jewelers and Watchmakers Supplies
CLARK BUILDING
PITTSBURGH, PA.

Massachusetts Horological Association

Col. W. H. Bright

Reports from Massachusetts show a decided upturn in general enthusiasm and interest towards meetings and general association activity.

No doubt this is caused through the dynamic leadership of their new president, Col. William H. Bright, who is carefully planning the association's activity.

On February 10th we held a regular meeting, the first in many months, with a very good attendance. The members were enthusiastic, most of them paid their dues, ordered permanent plaques and are making ready to engage in co-operative advertising.

Our membership drive is taking form. The by-laws have been revised. The association is planning on sending our president, Col. Bright, to the National Convention in Chicago. Several others from Massachusetts will also attend, as we don't wish to miss a single session of our National Convention activity.

T. J. FAGAN,
Correspondent.

New Haven Guild Elects New Officers

The following officers were elected during the month of February for the year 1937: President, Albert Monde; Vice-President, V. J. Bowers; Recording Secretary, W. E. Short; Corresponding Secretary, A. H. Rosenbeck; Treasurer, E. C. Stehle; Executive Board Members, A. R. Raphael and U. L. Sundblad with one more to be elected.

The state organization hopes to have established a new guild in Hartford, Conn., previous to the National Convention.

WILLIAM E. SHORT,
Secretary.

Third Annual Convention of Ohio Watchmakers Association

W. H. Johnson, State Pres.

The Third Annual Meeting of the Ohio Watchmakers was held in Toledo, Ohio, at the Waldorf Hotel, on February 28th. On Saturday night prior to the convention, a smoker was held at the Hotel for all members. Meeting was called to order by our President, Mr. W. H. Johnson of Toledo. Mr. Johnson gave a brief report on the activities of the Ohio Watchmakers Association. Mr. Johnson was followed by the presidents of the Guilds in Ohio. Our National President, Mr. Foegler talked for the Cincinnati Guild and spoke on the activities of his Guild. Mr. Raab, President of the Dayton Guild, reported on actions in Dayton. Mr. Luce of Columbus, gave a brief talk. Mr. Schirner of Toledo, spoke concerning the Toledo Guild. The Convention attracted about seventy-five watchmakers from all sections of Ohio. Talks were presented by our National Treasurer, Mr. Schneider of Toledo, and Mr. Rougeux, Vice-President of the Ohio Watchmakers Association.

The following officers were elected: President, Mr. W. H. Johnson, Toledo; Vice-President, Mr. M. A. Rougeux, Toledo; Secretary-Treasurer, L. W. Heimberger, Columbus; Sergeant at Arms, Wm. Funk, Cincinnati.

The following men were elected to the executive board: Mr. Scoerner, Toledo; Mr. Jos. Besse, Cincinnati.

Delegates to the National Convention: Jos. A. H. Voss, Cincinnati; Rudy Flaxmayer, Cincinnati; R. Fisher, Dayton; M. A. Rougeux, Toledo.

The Association voted Life Membership to our National President, Mr. Foegler, for his active interest.

The
E. & J. SWIGART
COMPANY

"A Good Supply House"

34 West Sixth Street
CINCINNATI, OHIO

Cincinnati Guild
Ohio Watchmakers Association

Cincinnati Guild, Ohio Watchmakers' Association held their forty-fifth meeting, which had been postponed due to the recent flood. The meeting was the first meeting of the year with all of the new officers present and in their chairs. Had a fine attendance. The main business of the evening was the State Convention, which is being held in Toledo, Ohio, February 28th. The Cincinnati Guild is sending fifteen members and delegates to the State Convention, and it is reported that an equal number or more will attend the Third National Convention in Chicago.

As bad as the Cincinnati and surrounding territory was effected by the flood, we are grateful to report there were but a few members who were effected by this devastating catastrophe. We received pleas for help from the Toledo boys for the flood sufferers in that section.

Business in general is on the up trend despite the recent disaster.

We welcome home after a lengthly stay in Florida, one of Cincinnati's leading jewelers, Mr. Jos. Vogelsary, mother, sister and family. Mr. Vogelsary reports business is fine in Florida, and that he enjoyed a much-needed vacation.

R. J. FLAXMAYER, *Recording Sec'y.*

Toledo Guild

On February 22nd we held our annual election and the following are the officers for 1937: President, M. A. Rougeux, 352 Victoria Place; Vice-President, Ed. S. Schirner, 241 Huron St.; Secretary, E. A. Kutz, 3618 Upton Ave.; Treasurer, E. S. Meyers, 2811 Upton Ave.

We have made elaborate plans for the State Convention to be held in our city February 28th. Complete report will follow for our April issue.

E. G. SCHIRNER.

Dayton Guild
Ohio Watchmakers Association

At the regular meeting of the Dayton Guild of the Ohio Watchmakers Association the following were elected as officers for the coming year:

Walter Rabb, re-elected for President; M. C. McCabe, Vice-President; S. V. Geile, re-elected for Treasurer; Ralph Apple, Secretary; R. J. Studer, Sergeant-at-Arms.

Executive Board—M. C. Rife, Andres Rolfes, J. C. McCabe.

At this meeting it was voted to change the date of our election of officers to the first meeting in November, and the officers then elected to take charge of the first meeting in January so as to have our new officers acquainted with their duties and in office the first of the year when all of our other business for the year is taken care of.

About fifteen members are planning to attend the State Convention at Toledo.

We are glad to say that Bill Rife, who has been our most efficient secretary since the beginning of our Guild, has gone into business for himself, and all the members of the Dayton Guild wish him success.

Respectfully submitted,
R. E. FISHER.

Horological Association of Pennsylvania

Pass Additional Laws for Their State

The Executive Board, consisting of officers and trustees of eleven men, must pass on each application for a plaque, and approval must be 75% of the Board. If all members are not present to secure a 75% approval, the absentees are to vote by mail through the Secretary. Without 75% approval the applicant cannot receive a plaque. This action has been taken to save ourselves trouble of withdrawing plaques should we give them to anyone just because he paid for it.

Elgin Introduces Four New "Cavalier" Series 8/0 Size Men's Watches

Latest models retail at $20 to $23.75. Jewelers welcome additions to popular group.

A quartette of smart "Cavaliers" have been selected by the Elgin National Watch Company to lead its parade of new models for 1937.

Introduced this month, the latest "Cavaliers" expend the line which scored so sensationally during the recent Christmas season. All are in the compact 8/0 size which is daily attracting more buyers. All are 7 jewel timepieces, embodying friction-set jewels, full interchangeability of parts, a mainspring which runs 45 hours on a single winding, and other advantages of the 8/0 movement.

Jewelers are unanimous in predicting a fast-selling future for the handsome newcomers. With one eye already on the approaching commencement season, retailers point out that both styling and price are bound to make the "Cavaliers" exceptionally attractive to young graduates. The manner in which the newest "Cavaliers" are cased, will be particularly popular among the younger generation. And in the four new models, special attention has been devoted to achieving designs which will "click" with this class of buyer.

Wholesalers have been fully supplied with stocks.

Boggs Watch Cleaning Machine Features Patented Eccentric Method

Featured in the Boggs Watch Cleaning Machine, which is manufactured by the C. L. Boggs Company of San Francisco, is a patented eccentric method which allows three-quarters of the watch movement to be in the fluid and one-quarter in the open center of the vortex created.

"The fluid is forced through the movement and thrown out through the center 8,000 times in 5 minutes," the C. L. Boggs Company states. "This friction of fluid through the movement produces a cleaner watch and more balance wheel action than can be had by hand or any other method. The balance can be left in the movement while being cleaned, and the most delicate hairspring or balance will not be damaged.

"There is a complete submersion of watch parts in the fluid and a forced circulation of fluid over the parts every revolution of the motor. Parts cannot run dry, due to our eccentric method, which prevents discoloration, spots, or oxides. Produces the maximum action, and the watches look like new."

The C. L. Boggs Company, 301 Prospect Avenue, San Francisco, will gladly send illustrated circular showing this patented eccentric method, and watchmakers are requested to send for this circular.

The Boggs Watch Cleaning Machine is being offered on a three-week free trial basis, it is announced.

MID-CONTINENT JEWELER

"BEST FOR THE WEST"

Made especially for Jewelers and Watchmakers of the Central and Southwest Territory, which we have served for 36 years.

Subscription $1.00 per Year

MID-CONTINENT JEWELER

541 Dierks Building **Kansas City, Mo.**

Helpful Books for the Horologist

Send Orders to THE AMERICAN HOROLOGIST, 3226 E. Colfax Ave., Denver, Colo.

The Watchmaker's Handbook

By Claudius Saunier. Translated from the French of Claudius Saunier, and enlarged by Julien Tripplin, F.R.A.S., and Edward Rigg, M.A. Over 500 pages. New eighth edition. 14 folding plates. **Price, $5.00**

Horology—The Science of Time Measurement and the Construction of Clocks, Watches and Chronometers.

By Eric Haswell, F.P.H.I. This new book is one of the best yet produced on this subject. The author has explained the principles of operation and the constructional details of clocks, watches and chronometers. Appropriate historical facts are embodied when necessary. 267 pages.
Price reduced to $5.00

Watch Repairing, Cleaning and Adjusting.

By F. J. Garrard. Covers the Cleaning and Repairing of Watches. Treats on the materials and tools used. Shows how to alter and adjust all kinds of English and Foreign Watches, Repeaters, Chronographs and Marine Chronometers. 214 pages. Ninth edition. Illustrated by over 200 engravings. **Price, $3.00**

Watch and Clock Makers' Manual.

By F. W. Britten. This book covers a large scope of practical repair work and embraces every type of watch from the early English Fusee to the modern wrist watch.

The use of the lathe and attachments is given thorough treatment.

The treatment of the hair spring is given considerable space, in a non-technical manner, with a description of forming breguet springs at the bench.

A section devoted to clocks is also included, and all known practical escapements are described in a manner easily grasped by the workman. 361 pages, 150 illustrations. **Price, $3.00**

The Junior Watchmaker.

By A. G. Thisell. Dealing with the lever escapement adjusting. **Price postpaid, $3.00**

Practical Balance and Hairspring Work.

By Walter J. Kleinlein. Beautifully bound in imitation Morocco, gilt edges, 115 pages, 43 illustrations. **Price postpaid, $3.50**

With the Watchmaker at the Bench.

By Donald DeCarle, F.B.H.I., for the practical watchmaker, 204 pages, illustrated.
Price postpaid, $2.25

The Marine Chronometer—Its History and Development.

By Lieut. Com. Rupert, T. Gould, R.N., F.R.G.S. The only book of its kind, over 300 pages, 40 full page photographs, and 85 drawings.
Price postpaid, $8.00

The Lure of the Clock.

By D. W. Hering. Every bench man and store should possess this book. 121 pages, 99 beautiful illustrations. **Price postpaid, $4.00**

Rules and Practice for Adjusting Watches.

By Walter J. Kleinlein. Beautifully bound gilt edges, 108 pages well illustrated.
Price postpaid, $3.50

Modern Methods in Watch Adjusting.

By Harold C. Kelly. Cloth bound, 126 pages and 13 illustrations. **Price postpaid, $2.65**

The Escapement and Train of American Watches.

By T. J. Wilkinson. Answers every escapement and train problem. **Price postpaid, $5.00**

Modern Watch Repairing and Adjusting.

By W. E. Borer. 120 pages, 121 illustrations essential for buyer, seller and repairer of all watches. **Price postpaid, $2.00**

Clockmaking—Past and Present.

By C. F. C. Gordon. With which is incorporated the more important portion of "Clocks, Watches, and Bells," by the late Lord Grimthorpe, relating to Turret Clocks and Gravity Escapements. By G. F. C. Gordon, M.A., A.M.I.C.E., Superintendent of Workshops of the Engineering Department of Cambridge University. A practical book of special interest to the Clockmaker and Repairer. 232 pages. Fully illustrated by diagrams and plates of Long Case, Bracket and other Clocks, Dials, Hands, etc. **Price, $5.00**

Clock Repairinng and Making.

By F. J. Garrard. A practical handbook dealing with Tools, Materials and Methods used in cleaning and repairing all kinds of English and Foreign Timepieces. 168 pages. Fifth Edition. Illustrated by 120 engravings. **Price, $3.00**

Modern Clocks, Their Repair and Maintenance.

By T. R. Robinson. All about the newest clocks for buyer and repairers. 120 pages, over 100 illustrations. **Price postpaid, $2.00**

Electrical Horology.

By H. R. Langman and A. Ball.

Contents — Electro-Magnetically driven clocks, electrically controlled clocks, electrically wound clocks, electric secondary dials or impulse clocks, electrical striking gears, the synchronizing of electric and other clocks and miscellaneous electric clocks, recent developments in electric clocks. 200 pages. 93 illustrations. 1935 Revised Edition.
Price, $3.00

Modern Electric Clocks.

By Stuart F. Philpott. An authoritative manual for clockmakers, describes every principle of construction, installation and upkeep.
Price postpaid, $2.25

The Clock Book.

By Wallace Nutting. Descriptions of American and European antique clocks, list of their makers, etc., 312 pages, 251 illustrations.
Price postpaid, $1.80

Modern Methods in Horology.

By Grant Hood. A book of practical information for watchmakers. **Price postpaid, $2.50**

The American Horologist

Volume No. 1, 400 pages, over 230 illustrations, bound in beautiful black imitation leather, gold embossed, prepaid. **Prepaid, $4.00**

Bound in cloth cover, gold embossed.
Prepaid, $3.50

SPECIAL NOTICES

Payable in advance.

Rates under all headings except "Situations Wanted,"$1.50 for first 25 words. Additional words, 5c a word.

SITUATIONS WANTED, 75c for first 25 words. Additional words, 5c a word.

Heavy type, $2.50 for first 25 words. Additional words, 10c a word.

Name, address, initials and abbreviations count as words, and are charged for as part of the advertisement.

If answers are to be forwarded, postage must be enclosed.

Special notice forms close 30th of month.

Unless the advertiser instructs us to publish his name and address, all answers will be directed care THE AMERICAN HOROLOGIST.

SITUATION WANTED

Watchmaker — One who can take full charge of repair department or jewelry store which can supply the very best of references, and can increase repair department revenue; have averaged for the last 265 watches estimated and repaired $7.11 per watch; desirous of securing a permanent position with a reputable company any place in the United States, prefer middle west. Address Box A-17, The American Horologist.

Watchmaker — Long experience at the bench; capable of taking charge of repair department on any work in a jewelry store; 45 years of age; will accept a position anywhere; expect a salary of $35.00 per week to start. Address Box A-20, The American Horologist.

Watchmaker — Twenty years' experience; now located in Texas; wishes to locate in vicinity of Southwest or California; has the best of references; will work in trade shop if necessary; salary expected $35.00 per week. Address Box A-21. The American Horologist.

Watchmaker — Twenty-five years' experience; wishes to locate in Colorado or; West; can supply the best of references; wishes to locate with company who appreciates the finest of warkmanship. Address; Box A-22. The American Horologist.

Watchmaker—Ten years' experience; capable of handling any type of work; 32 years of age; married; wishes to locate in southern California, Texas or Florida, due to wife's health; salary expected $30.00 per week. Address Box A-23. The American Horologist.

Watchmaker—23 years of age, Bradley graduate, wishes position preferaby in Colorado, will consider other locations, willing to start from $20.00 to $25.00 per week. Address The American Horologist, Box A-26.

Watchmaker—20 years' experience on all grades and sizes, clock and light jewelry repairing, go anywhere. Address O. J. Meyer, Carlyle, Illinois.

HELP WANTED

The National Employment Bureau has numerous positions open for every type of workman. If desirous of making a change or securing a position, direct your mail, including qualifications, location and expected salary, to Employment Department, United Horological Association of America National Headquarters, 3226 East Colfax Ave., Denver, Colo

Wanted—Watchmaker who is accustomed to working on very high-grade watches, must reside in the vicinity of New York City, no others need apply. Address The American Horologist, Box B-24.

Wanted—Watchmaker apprentice residing in the vicinity of New York City, a young man who has had one or more years' experience desiring to advance himself in the art of watch repairing. Address The American Horologist, Box B-25.

FOR SALE

For Sale—Jewelry store, due to illness, excellent opportunity for watchmaker, 30 years in same location, low rent. Address LaMacchia, 1115 Main Street, Bridgeport, Conn.

WANTED

Book—titled "Ways & Means, by Cleaves", covering split chucks and staking toolpunches, published by Spain & Chamberlin, N. Y. Address Box 27, the American Horologist.

Book—"Time Telling Through the Ages, by Harry C. Brearly." Address Box 28, The American Horologist.

Wanted — Material and tool catalogues earlier than the year 1890. Address The American Horologist.

BLUEPRINTS

Working drawings for construction of wooden Columbus Clock consisting of a set of 15 blueprints for $3.25 postpaid. Address THE AMERICAN HOROLOGIST.

Working drawings for the complete construction of pinwheel movement clock consisting of eleven blue prints postpaid for $3.00 per set. Address The American Horologist.

Working drawings — For complete construction of Graham Dead Beat Escapement Clock, consisting of 11 blueprints, postpaid for $3.50 per set. Address The American Horologist.

SLIDES

For advertising in theaters are now available in two designs, black and white at $1.00 each or in national colors at $1.50 each. These slides are built about our national, insignia creating public attention to honorable repair service.

Supplied to members only postpaid upon receipt of price. Address Advertising Department National Headquarters.

ADVERTISING MATERIAL

Send to Advertising Department National Headquarters for free samples showing prepared advertising material designed for newspaper, letter, cards and counter circulars, mats, plates, etc.

For National and Local Information Contact the Following Organizations

Who function as a combined unit for the advancement of our craft. Membership at large represented in virtually every state.

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Ernst Peterson, Pres., 1626 Welton St., Denver.
O. R. Hagans, Sec., 3226 E. Colfax Ave., Denver.

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D. E. Heigert, Sec., 900 Sherman

Greeley Guild
Howard Weiss, Sec., 829 9th St.

La Junta Guild
A. J. Bradley, 418 Hasp Ave., La Junta, Colo.

Boulder Guild
Fred Comstock, Sec., 1819 Pine.

Pueblo Guild
H. J. Affley, Pres., 926 W. 12th St.

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Bernard Scanlon, State Secy., 18 Elmwood Ave., Waterbury.

Fairfield Watchmakers Guild
James Aspinwall, Pres.
Michael Enright, Secy., 2854 Fairfield Ave., Bridge.

New Haven Watchmakers Guild
Albert Monde, Pres.
Wm. E. Short, Secy., 35 Springside Ave., Westville.

Waterbury Watchmakers Guild
Noel Phaneuf, Pres.
Bernard Scanlon, Secy., 18 Elmwood Ave.

Watchmakers Guild of New London
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Richard J. Kenney, Secy., 93 Main St.

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Greater Miami Watchmakers Guild
H. A. Andrews, Sec., 303 Second Ave., W. W.

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Chas. A. Braun, Special Rep., 434 State St., Weiser.

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Ernst Wetteroth, Sec., 10 Westport Rd., Kansas City.

Kansas City Guild
James W. Anderson, Pres., 4702 Broadway.
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K. A. Cooper, Sec., N. Y. Central Terminal.

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Herman Cooper, Special Rep., 1698 Vyse Ave.

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Lawrence G. Ballard, Sec., Box 596, Wilson.

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L. W. Heimberger, Secy., 245 S. High St., Columbus.

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Leo Hoffer, Pres.
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Dayton Guild
Ralph Apple, Secy., 3131 W. 3rd St.

Columbus Guild
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E. A. Kutz, Secy., 3618 Upton Ave.

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H. S. Cabugao, Sec., Dagupans, Pangasinan.

RHODE ISLAND
Hamilton E. Pease, Special Rep., 51 Empire St., Providence.

TEXAS

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C. P. Martin, 117 N. Stanton St.
R. L. Nordien, Sec., 3510 Louisville.

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H. E. Anderson, Special Rep., 301 Joshua Green Bldg., Seattle.

Cowlitz Co. Watchmakers' Guild
Jay V. Carithers, Secy., 1265 Commerce Ave., Longview.

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Richard A. Meisner, Pres., 1839 Green St., Racine.
B. W. Heald, 339 N. 35th St., Milwaukee.

Milwaukee Guild
N. F. Ellenbecker, 4058 No. 23rd St.

Racine Guild
H. C. Jensen, Sec., 1648 Kearney Ave.

NATIONAL CONVENTION

United Horological Association of America, Inc.

CHICAGO, ILLINOIS, APRIL 26-27-28, 1937

Some of the Subjects to be Covered During This Convention

Prominent members of the House of Representatives of two states who will speak on the subject of Watchmakers' Licensing bills.

National Advertising as it applies to our profession. Speakers on this subject will be from some of the most outstanding sources.

Organization and its necessity for the welfare of our craft.

Education as it applies to our craft. Speakers will be those who are in authority on the subject.

Educating the consuming public and the programs planned and in operation at this time.

Radio programs designed to foster a greater interest in finer time recording instruments and service.

Time as it applies to the transportation in this country will be discussed by prominent heads of the various railroads.

Merchandising service, a most necessary subject which has been neglected in the past.

Future programs for the National to follow, greater aid to our vast membership, greater advertising programs, more elaborate educational programs for Guild usage, the enlargement of all National Boards to work out desirable programs covering numerous subjects. Programs of co-operation with the retail jeweler, the manufacturer, the distributor and the consuming public.

Reports from all National Committees, Membership, Advertising, Radio, Publicity, Educational, Diagnostic, Research, Technical, Building, National Library, National Historian, Legislative, National Employment, National Museum, Executive Board, Board of Trustees, Financial.

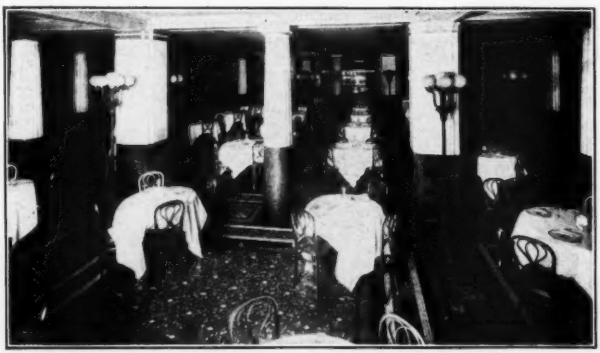
Educational tours have been planned, and entertainment, and above all the show of new merchandise by our exhibitors, which will be worth every man's time.

Awarding of prizes for winners in National Workmanship Contest.

Decision on definite dates for National Watch Inspection Week which will be a yearly event, and will be greatly publicized from now on.

Complete showings of all advertising material and methods used throughout the U.S.A. by our members and associations.

Showing of drawings for our National building and grounds.



Dine with us in the luxurious surroundings of the Congress Hotel, April 26-27-28. You will find the menus in keeping with your budget.